AUTHOR: Novikov, A. S., Engineer

TITLE: New Methods of Quality Control in the Electrical Industry. (O novykh methodakh kontrolya kachestva produktsii elektropromyshlennosti)

PERIODICAL: Vestnik Electropromyshlennosti, 1957, No.2. pp.63-65 (USSR).

ABSTRACT: Much attention is now being given to the introduction of modern inspection methods in electrical engineering factories. Statistical methods are being used more extensively and new techniques such as X-ray, magnetic, ultrasonic and stroboscopic methods are becoming available.

Card 1/6

TITLE: New Methods of Ouality Control in the Electrical Industry. (O novykh metodakh kontrolya kachestva produktsii elektropromyshlennosti)

Improved inspection procedures depend largely on making inspection procedures automatic. Such automation of inspection may be passive or active. Passive inspection is that in which the finished products are inspected and sorted. Several examples of this kind of procedure in the manufacture of heating elements, watt-hour meters and other products are given. Active automatic inspection fits into the technological regulation and control of the manufacturing process without direct human intervention. This is the

TITLE: New Methods of Quality Control in the Electrical Industry. (O novykh metodakh kontrolya kachestva produktsii elektrompromyshlennosti)

most effective type of organization of automatic inspection and it is being more widely applied in the electrical industry. Many examples are qouted, such as the automatic balancing of rotors and the manufacture of cables.

Statistical methods are being widely used in conjunction with quality control charts. The methods used include a statistical analyzer which not only makes the necessary measurements and finds the extreme and arithmetic mean values but also produces a histogram of sample distribution and performs other functions.

Card 3/6

TITLE: New Methods of Quality Control in the Electrical Industry. (O novykh metodakh kontrolya kachestva produktsii elektrompromyshlennosti)

The use of statistical methods has resulted in a reduction of scrap.

Examples are given of the use of ultrasonic inspection methods with respect to turbo-generator rotors. A vibrometer is used to assess the vibration properties of large machines Stroboscopic methods are used in counting the revolutions of integrating meter discs. The guarantee method of inspection is used in a number of factories, where the inspector works within a narrower set of limits than those indicated on the drawing. This is quite necessary in accepting mass produced parts. There is an

Card 4/6

TITLE: New Methods of Quality Control in the Electrical Industry. (O novykh metodakh kontrolya kachestva produktsii elektrompromyshlennosti)

increasing tendency to carry out inspection at the place of work and during the production process so that the quality of production can be determined and scrap quickly eliminated. Several examples of this tendency are quoted.

In some respects however, inspection methods are still inadequate and result in excessive scrap. In some plants the inspectors spend more time in filling forms than in inspection work.

Card 5/6 The article contains 1 diagram and no references.

TITLE: New Methods of Quality Control in the Electrical Infustry. (O novykh methodakh kontrolya kachestva produktsii elektrompromyshlennosti)

ASSOCIATION: Munstry of Electrotechnical Industry - (Ministersvo elektrotekhnicheskoy promyshennosti)

PRESENTED BY:

SUBMITTED:

AVAILABLE: Library of Congress

Card 6/6

BOGAYEVSKIY, A.P.; GORELIK, B.M.; ZUYEV, Yu.S.; KUZ'MINSKIY, A.S.; NOVIKOV, A.S.

Some results of the research work conducted by the Scientific Research Institute of the Rubber Industry. Kauch. i rez. 22 no. 1: 1-10 N '63.

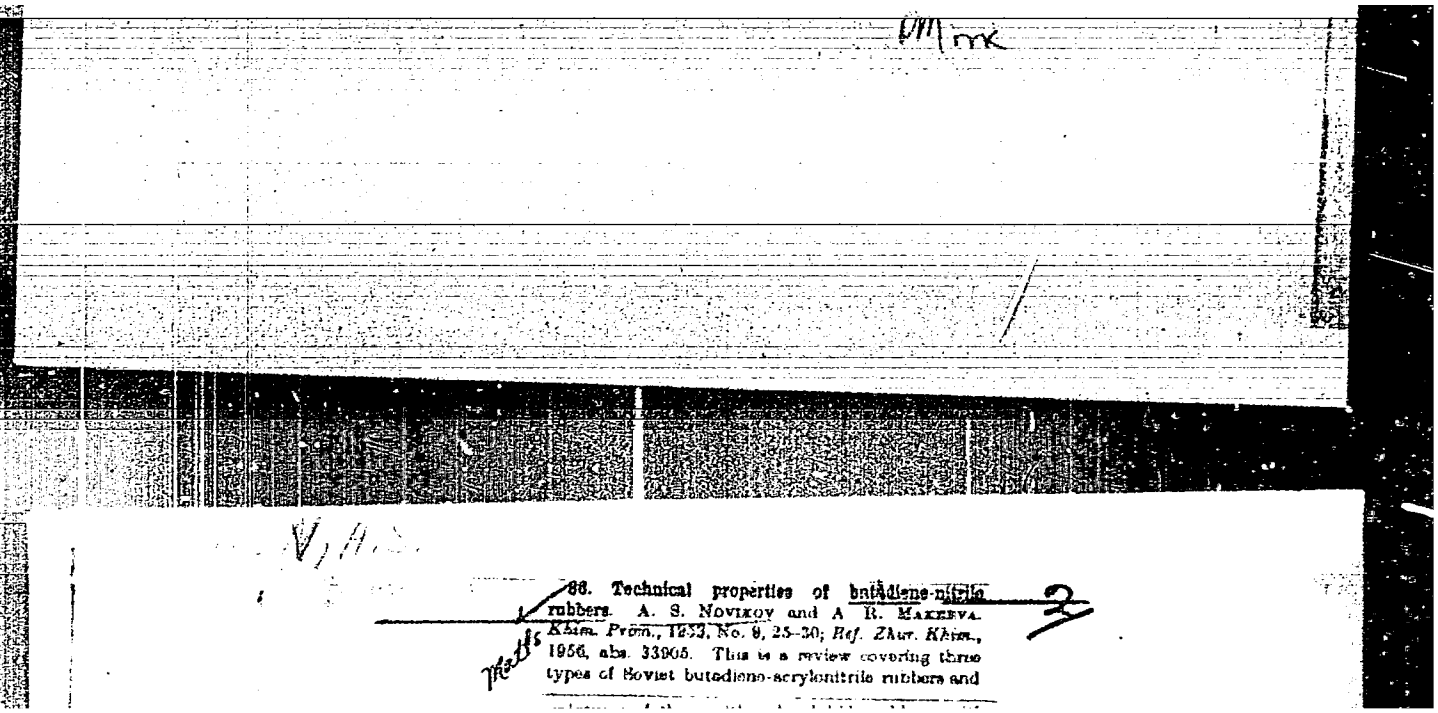
1. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti.

GILINSKAYA, N.S.; GALIL-OGLY, F.A.; NUDEL'MAN, Z.N.; NOVIKOV, A.S.

Vulcanization of the fluoropolymer of Fluoroelastomer 26 with Schiff bases. Kauch. i rez. 24 no.9:2-6 '65.

(MIRA 18:10)

1. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti.



88. Technical properties of butadiene-nitrile rubbers. A. S. Novikov and A. R. Makeeva. *Khim. Prom.*, 1952, No. 9, 25–30; *Ref. Zhur. Khim.*, 1956, abs. 33905. This is a review covering three types of Soviet butadiene-acrylonitrile rubbers and

NOVIKOV, A. S.

4478. Dependence of the basic properties of mixtures and [illegible] rubbers on the initial

5(4) mail

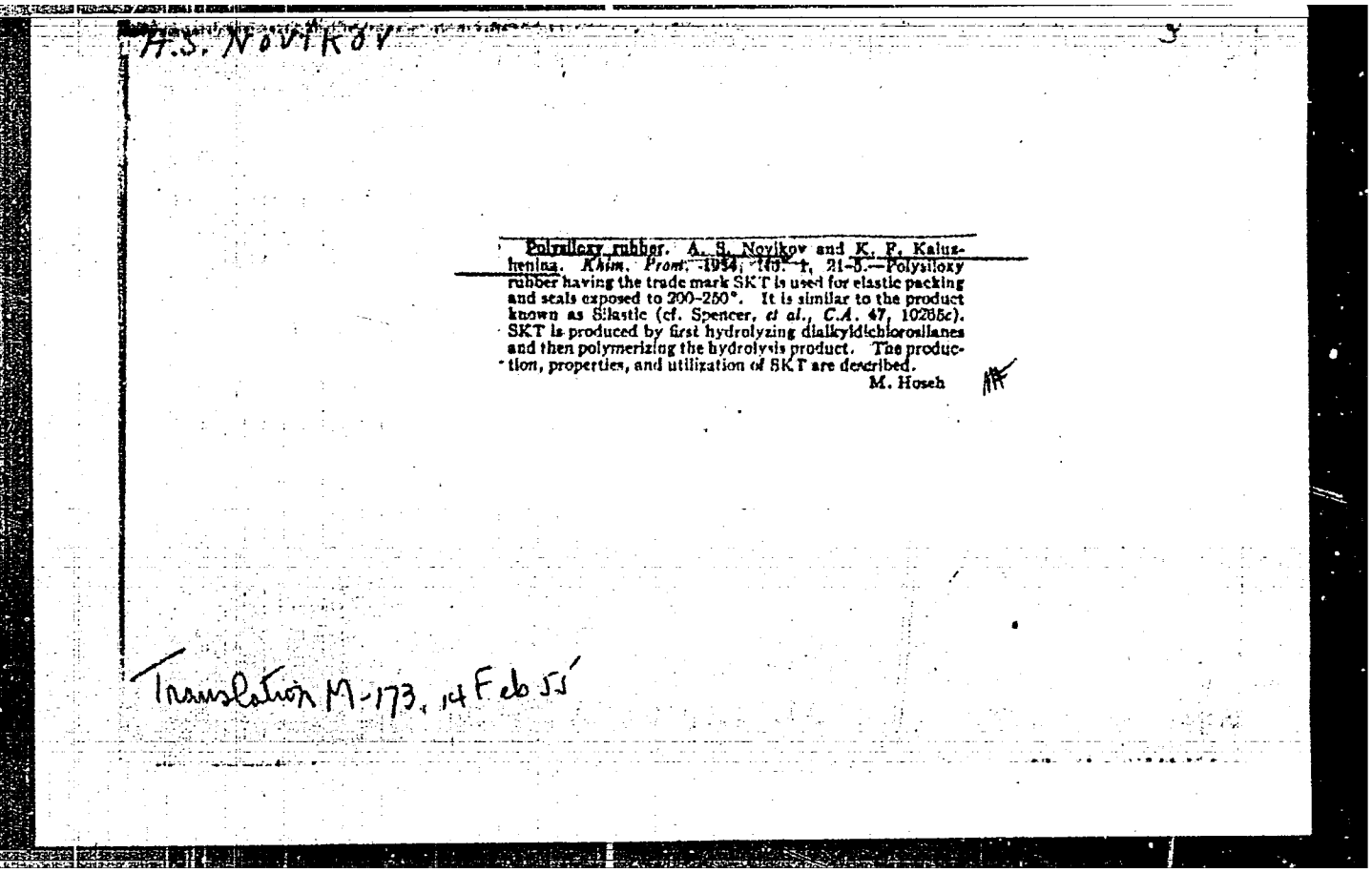
NOVIKOV, A.S.

5

USSR.

978. Dependence of the basic properties of mixtures and vulcanisates of butadiene-styrene rubbers on the initial molecular weight. A. S. NOVIKOV, M. B. KHAIKINA, T. V. DOROKHINA, and M. I. ARKHANGELSKAYA. *Coll. J. U.S.S.R.*, 1953, 15, 53-63; *Chem. Abs.*, 1954, 48, 13201; *Rubb. Chem. Technol.*, 1954, 27, 950-9. Cf. this journal, 1953, abs. 4478. English translations of this paper now appear.

3S2D21MD23.0631



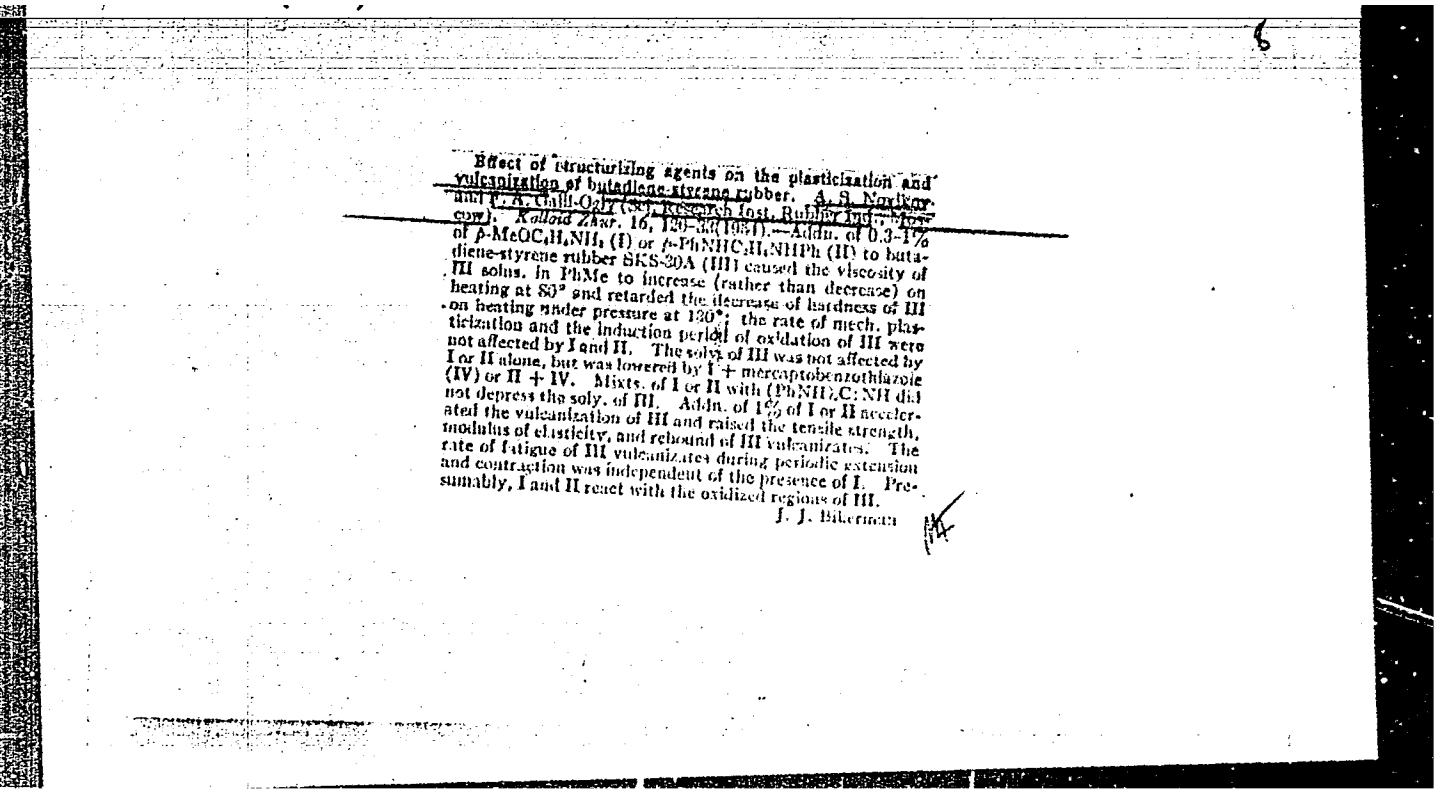
A.S. Novikov

3

Polysiloxy rubber. A. S. Novikov and K. F. Kalugheniua. *Khim. Prom.* 1954, No. 1, 21-3.—Polysiloxy rubber having the trade mark SKT is used for elastic packing and seals exposed to 200–250°. It is similar to the product known as Silastic (cf. Spencer, *et al.*, *C.A.* 47, 10285c). SKT is produced by first hydrolyzing dialkyldichlorosilanes and then polymerizing the hydrolysis product. The production, properties, and utilization of SKT are described.

M. Hoseh

Translation M-173, 14 Feb 55



Effect of structurizing agents on the plasticization and vulcanization of butadiene-styrene rubber. A. S. Novikov and T. A. Chilli-Ogly (Leningrad Research Inst. Rubber Ind., Moscow). *Kolloid Zhur.* 16, 129–33(1954).—Addn. of 0.3–1% of *p*-MeOC$_6$H$_4$NH$_2$ (I) or *p*-PhNHC$_6$H$_4$NHPh (II) to butadiene-styrene rubber SKS-30A (III) caused the viscosity of III solns. in PhMe to increase (rather than decrease) on heating at 80° and retarded the decrease of hardness of III on heating under pressure at 120°; the rate of mech. plasticization and the induction period of oxidation of III were not affected by I and II. The soly. of III was not affected by I or II alone, but was lowered by I + mercaptobenzothiazole (IV) or II + IV. Mixts. of I or II with (PhNH)$_2$C:NH did not depress the soly. of III. Addn. of 1% of I or II accelerated the vulcanization of III and raised the tensile strength, modulus of elasticity, and rebound of III vulcanizates. The rate of fatigue of III vulcanizates during periodic extension and contraction was independent of the presence of I. Presumably, I and II react with the oxidized regions of III.

J. J. Bikerman

NOVIKOV, A. S.

USSR.

Effect of structurizing agents on the plasticization and vulcanization of butadiene-styrene rubber. A. S. Novikov and F. A. Galil-Oglv. *Collord J. U.S.S.R.* 10, 139-41 (1950)(Engl. translation).—See *C.A.* 48, 9000c.

H. L. H.

Novikov, A.S.

977. Effect of molecular weight of rubber on the kinetics of vulcanization and formation of space lattice. A. S. NOVIKOV, G. M. BARTENEV, and F. GALIL-OGLY. *Rubb. Chem. Technol.*, 1964, 37, 925–9. Cf. this journal, 1964, abs. 4381. An English translation of this paper now appears.

3S2D21MD23.572

NOVIKOV, A.S.

The effect of molecular weight of rubber on the kinetics of vulcanization and formation of space lattice. A. S. Novikov, G. M. Bartenev, and F. A. Galil-Ogly. *Doklady Akad. Nauk S.S.S.R.* 94, 253–6(1954).—Expts. show that the rate of vulcanization at the various stages of the process is not affected by the mol. wt. of the starting material (styrene-butadiene rubber fractions with av. mol. wt. from 100,000 to 1,170,000) as shown by bound S detd. periodically during vulcanization. The dependence between the amt. of reacted S necessary for the initial formation of a 3-dimensional space lattice and the reciprocal of mol. wt. is linear. In vulcanization of rubber with mol. wt. under 1,000,000, there is an initial cross-linking of chains into larger aggregates, and only after achievement of this "crit." mol. wt. does the process lead to a continuous space lattice of the vulcanizate, so that the S utilized in the "growing" process is not utilized for vulcanization cross-linking. The rate of lattice formation, after the addn. of an amt. of S which is detd. by the original mol. wt., does not depend on the magnitude of the original mol. wt. The results are shown graphically. The following amts. of S (in %) are necessary for the initial formation of the space lattice for various mol. wt. fractions: 0.18 for 700,000; 0.31 for 500,000; 1.2 for 140,000; and 1.8 for 100,000. In early stages of vulcanization the ratio of the no. of unions among the chains to the amt. of bound S is const., regardless of mol. wt.

G. M. Kosolapoff

Novikov, A. G.

USSR/Chemical Technology. Chemical Products and Their Application -- Crude rubber, natural and synthetic. Vulcanized rubber, I-21

Abst Journal: Referat Zhur - Khimiya, No 2, 1957, 6023

Author: ~~Novikov, A. G.~~, Bartenev, G. M., Galil-Ogly, F. A.

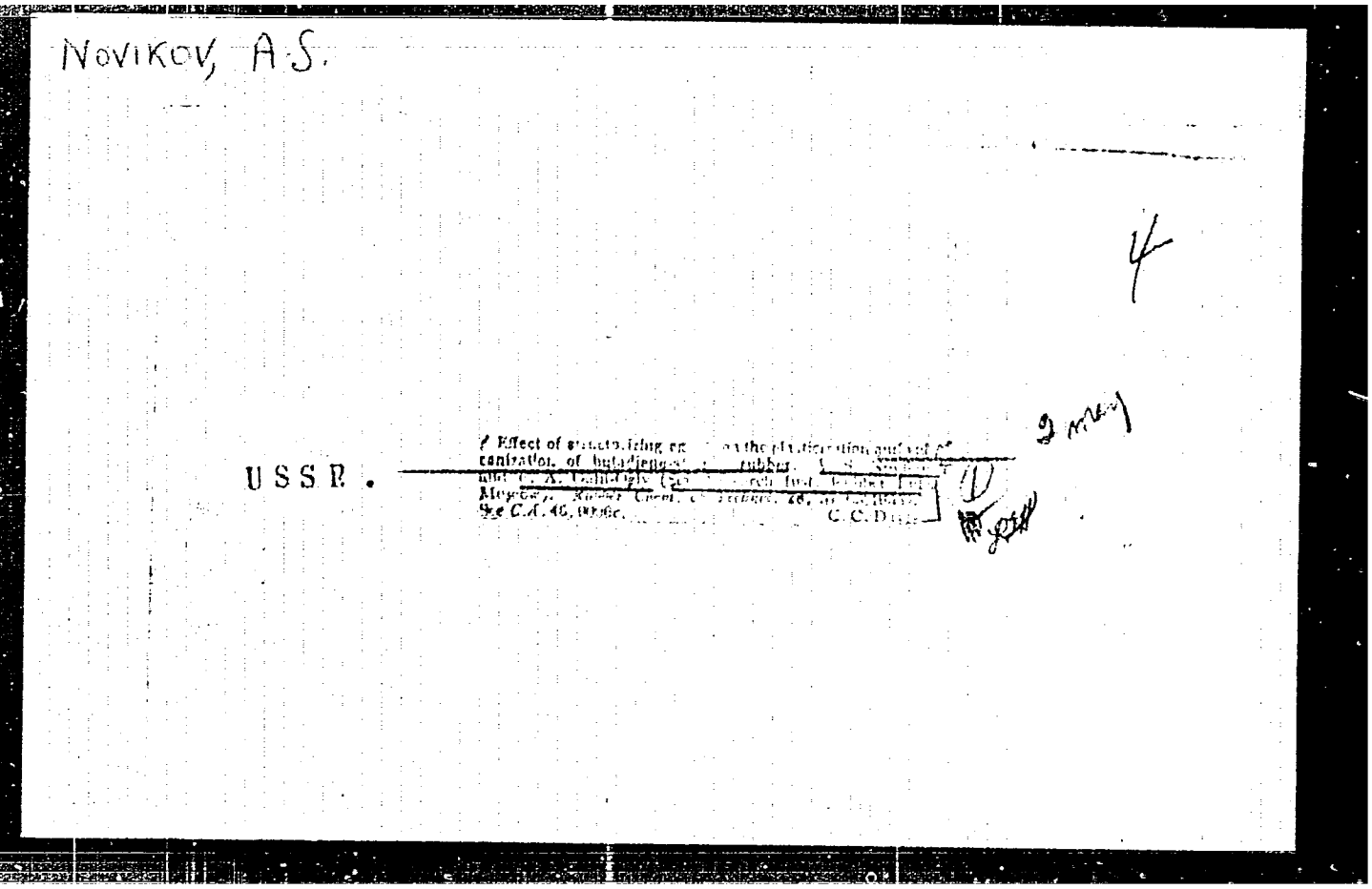
Institution: None

Title: Effect of Magnitude of Initial Molecular Weight of Rubber on Mechanical Properties and Dynamic Fatigue of Vulcanizates

Original Publication: Sb. Stareniye i utomleniye kauchukov i rezin i povysheniye ikh stoykosti. L., Goskhimizdat, 1955, 140-156

Abstract: A study was made of vulcanizates prepared from different fractions of SKS-30A of molecular weight 50,000-1,200,000. Mechanical properties were studied using a dynamometer of the Polanyi type, and the fatigue by means of a special apparatus, at constant amplitude of deformation and also with constant terminal load (selecting the residual deformations). Rate of addition of S to rubber does not depend on its molecular weight, although degree of vulcanization, determined on

Card 1/2



Novikov, A.B.

Effect of chain configuration on strength of vulcanizates. A. S. Novikov, T. V. Porokhina and P. I. Zubov. (*Dokl. Akad. Nauk SSSR*, 1955, 105, 514—516).—The viscosity of solutions of butadiene rubber in CCl_4 rises, and in C_6H_6 falls, with rising temp. from 20° to 80°; this suggests that the polymer chains are coiled in C_6H_6 and extended in CCl_4. The tensile strength and elasticity of vulcanizates, made by adding stearic acid, ZnO, MgO, thiuram, mercaptobenzthiazole, lamp black, and S to the solutions, evaporating off the solvent, and heating the residues for 70—100 min. at 143° in N_2, are greater for CCl_4 than for C_6H_6 solutions, indicating that the chain configuration prevailing in solution is fixed on the filler particles, as an oriented layer. If the residues are stretched to double their initial length before vulcanising, the products are of equal strength, confirming the view that the greater strength of vulcanisates from CCl_4 solution is due to their arrangement of parallel extended chains.

R. Truscott.

3

M.A. YOUTZ
2 copies

SOV/81-59-9-33452

Translation from: Referativnyy zhurnal. Khimiya, 1959, Nr 9, p 562 (USSR)

AUTHORS: Novikov, A.S., Skuba, I.A., Kaluzhenina, K.F.

TITLE: An Investigation of the Interaction of Thermoplastic Resins With Synthetic Rubbers

PERIODICAL: Tr. N.-i. in-ta rezin. prom-sti, 1956, Nr 3, pp 56 - 72

ABSTRACT: The effect of the thermoplastic resin (TR) 110 on the mechanical properties of unfilled and carbon black mixtures of SKN-26 has been studied. TR 110 combines with raw SKN-26 rubber and masticates it. In the vulcanization TR 110 interacts chemically with SKN-26 and S. The characteristic of the change of bond types in the vulcanization of an unfilled SKN-26 mixture with 20 weight parts of TR 110 has been cited. In proportion to S consumption the rubber-resin bonds accumulate in the vulcanizate. The deterioration of the physical-mechanical properties of carbon black vulcanizates with an increase in the TR 110 doses is explained by the formation of micro- and macro-

Card 1/2

SOV/81-59-9-33452

An Investigation of the Interaction of Thermoplastic Resins With Synthetic Rubbers

nonhomogeneous domains due to the appearance of two types of bonds, as well as due to insufficient compatibility of rubber with resin in the resitol and resite stage.

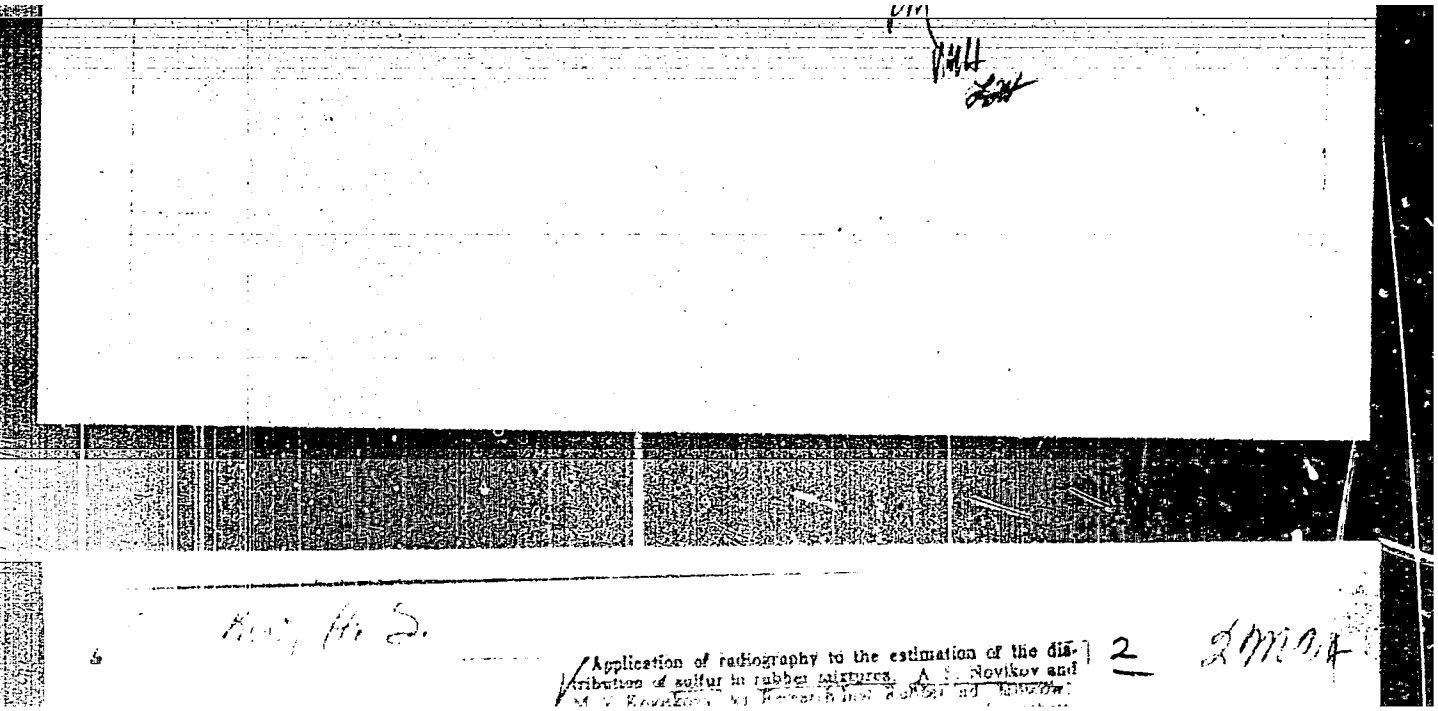
V. Olagolev

Card 2/2

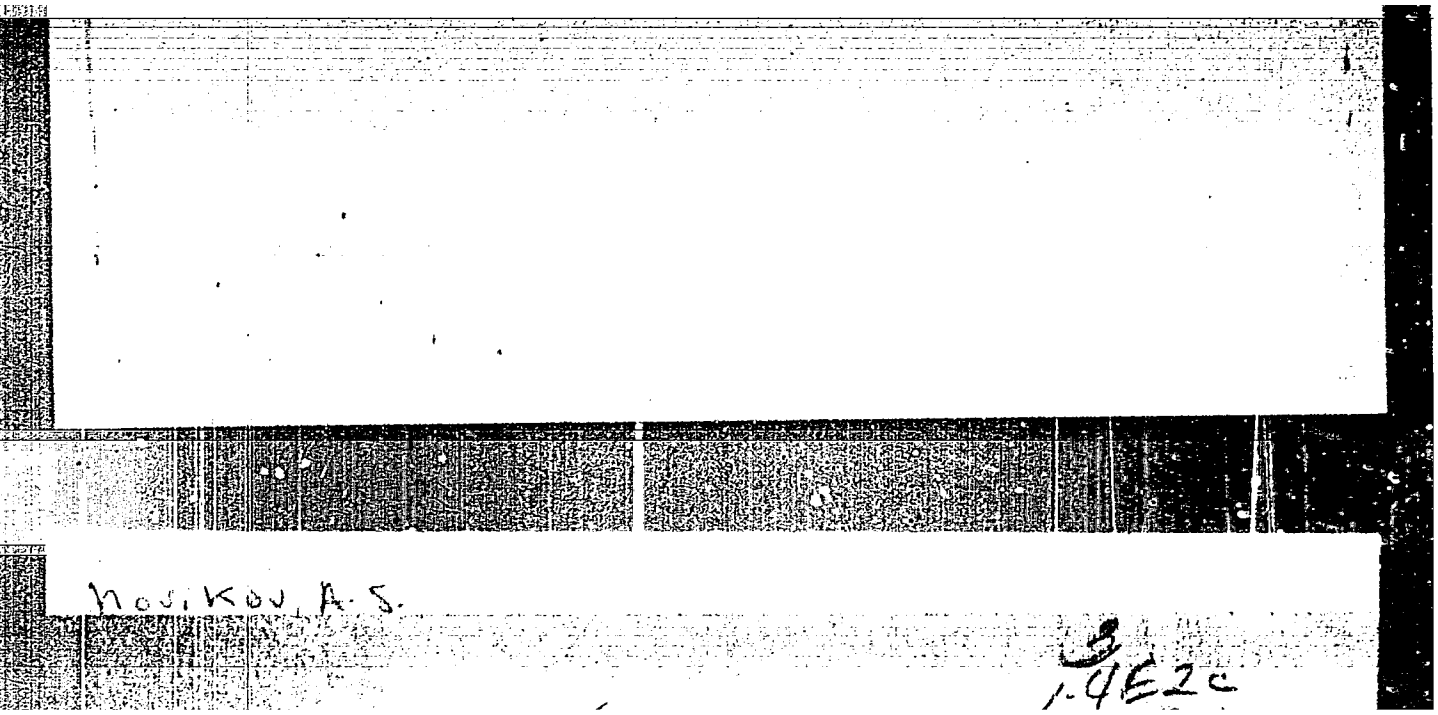
NOVIKOV, A. S.

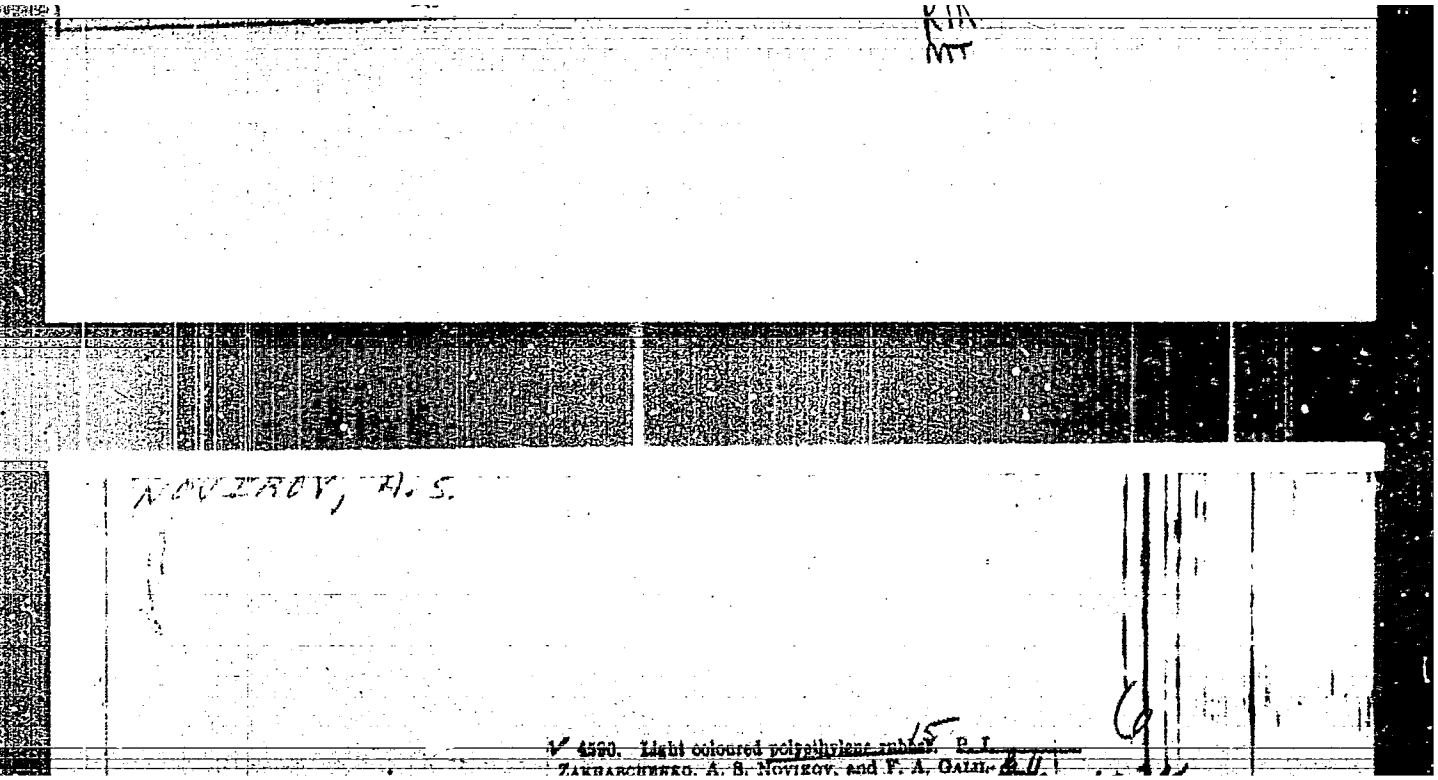
4142. Effect of the initial molecular weight of rubber on the tensile strength and fatigue of its vulcanizates. G. M. BARTENEV, A. S. NOVIKOV, and F. A. GALIL-OGLY. *Kol. Zh.*, 1956, 18, 7-12. *Chem. Abs.*, 1956, 50, 9778. A butadiene-styrene rubber was divided into six fractions of molecular weights between 56,000 and 1,120,000 (fractions A to F). With increase of the concentration of sulphur in fraction F, the number, N, of crosslinks per cm rose linearly with the amount a of bound sulphur. When sulphur was added to fraction B, N remained small until a reached 1.8%, then started to rise linearly with a. The slope of the line was identical with that for fraction F. Thus, a coherent lattice forms only if the molecular weight M is greater than 10^6; when the initial M is smaller, sulphur links gradually raise it, and lattice formation starts when it reaches 10^6. N was calculated from $N = 1.3 \times 10^{18} E^{3/2}$, E being the equilibrium modulus of the vulcanisate in kg/sq. cm. Each fraction was vulcanised with $a = 2.05\%$; the tensile strength σ increased from fraction B (e.g. 10 kg/sq. cm) to fraction F (over)

1/2



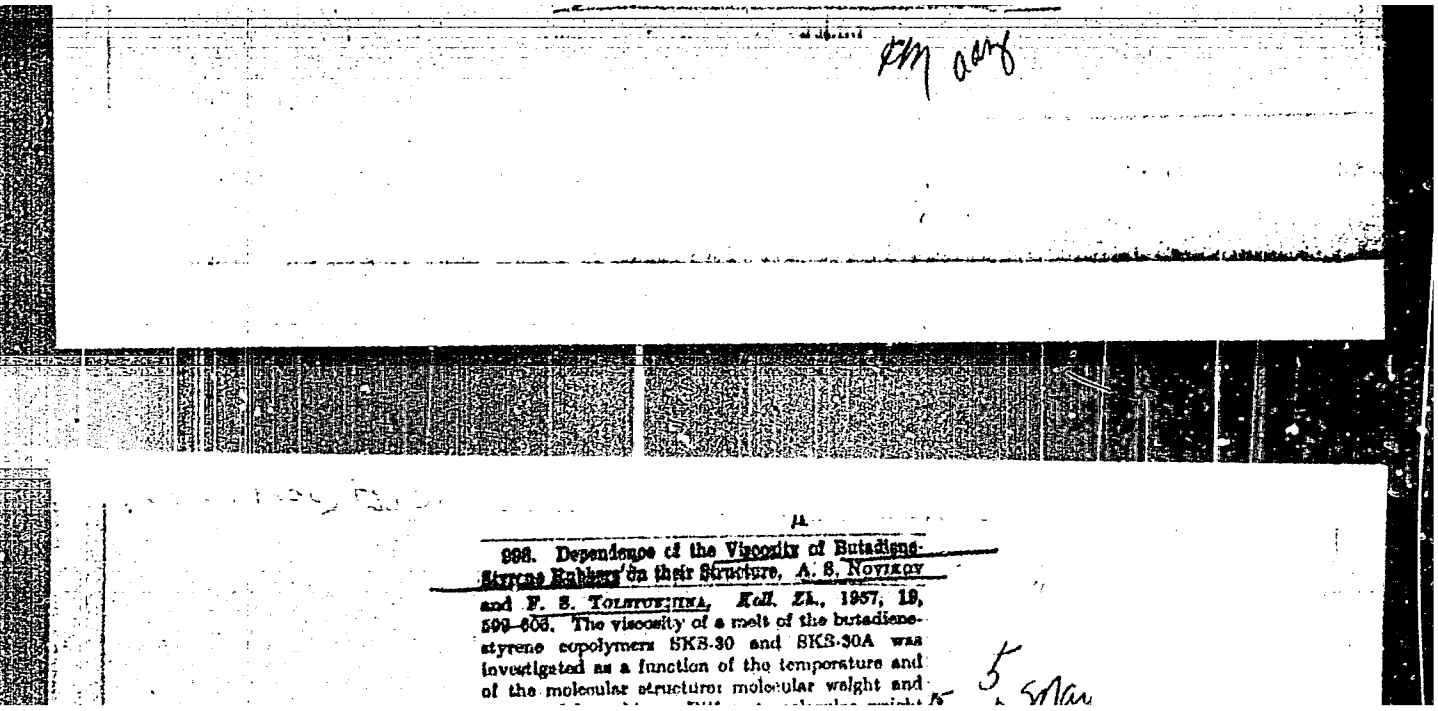
Application of radiography to the estimation of the distribution of sulfur in rubber mixtures. A. I. Novikov and





NOVIKOV, N. S.

V 4590. Light coloured polyethylene rubber. P. I. ZAKHARCHENKO, A. S. NOVIKOV, and F. A. GALIL-OGLU.



998. Dependence of the Viscosity of Butadiene-Styrene Rubbers on their Structure. A. S. Novikov and F. S. Tolstoshina, *Koll. Zh.*, 1957, 19, 599–603. The viscosity of a melt of the butadiene-styrene copolymers SKS-30 and SKS-30A was investigated as a function of the temperature and of the molecular structure: molecular weight and

Distr: 4E2c(j)

AUTHOR: Markovich, G. A.

TITLE: New Successes in the Rubber Goods Industry. (Novye uspekham promyshlennosti rezinovykh tekhnicheskikh izdeliy).

PERIODICAL: Kauchuk i Rezina, 1958, Nr.1. pp. 1 - [illegible] (USSR).

ABSTRACT: A meeting of the workers in the rubber goods industry, the Research Institute of Rezinoproyekt (Research [illegible] sovnarkhozov), and the Ministry for the Chemical Industry (Ministerstvo khimicheskoy promyshlennosti) was held in Moscow between 8th - 11th January, 1958. Plans for the development of the industry during 1958-1965, results of research work carried out during 1957 and questions of co-ordination and co-operation of

New Successes in the Rubber Goods Industry.

were discussed. In a number of factories vulcanisation presses were automised. The Research Institutes investigated continuous vulcanisation of rubberised fabrics by infra-red rays; the continuous production of rubber cords and tubes; a new machine for making moulded products; new active fillers (Ca silicates, calcium fluoride, precipitated activated chalk etc.). The quality of rubber goods (heat stability, frost resistance, resistance to wear and to deformation etc.) should be improved. It was recommended to start production of the following: accelerators and ultra-accelerators (dithiocarbamates), thiurams, xanthogenates, plasticizers, e.g. Renatsit 4 and 5, peptone 22, plasticizers for low-molecular polymers of the Hycar type (Хайкар V-10), coumarone-indene resins, anti-ageing agents, stable pigments and organic and inorganic dyes etc.

AVAILABLE: Library of Congress.

Card 2/2

NOVIKOV, A.S.

AUTHORS: Novikov, A.S., and Reznikovskiy, M.M. 28-58-1-26/34

TITLE: In the Technical Committee "Caoutchouc" (V tekhnicheskom komitete "Kauchuk")

PERIODICAL: Standartizatsiya, 1958, # 1, pp 68-69 (USSR)

ABSTRACT: The article presents information on the latest session of the ISO/TC 45 in Zurich, Switzerland. Delegations from the USA, Brasil, Great Britain, Hungary, Germany, Holland, India, Italy, Poland, France, and the USSR participated. For the first time, the USSR took part in the work of this TC. Recommendations for the international standardization of physico-mechanical and physico-chemical test methods for caoutchouc and rubber were discussed. The Soviet delegation participated in the work group sessions, where test methods for aging, tear resistance, frost-proofness, adherence of rubber to metal, etc, were discussed. Both the "Muni" and "Kanavts" viscosity-testers were referred to the committee for recommendation.

AVAILABLE: Library of Congress

Card 1/1

AUTHORS: Novikov, A.S.; Tolstukhina, F.S. 69-20-3-17/24

TITLE: The Plastoelastic Properties of SKN-26 Rubber (Plastoelasticheskiye svoystva kauchuka SKN-26)

PERIODICAL: Kolloidnyy zhurnal, 1958, vol XX, Nr 3, pp 361-367 (USSR)

ABSTRACT: The plastoelastic properties of SKN-26 rubber in the solid phase have been investigated in relation to molecular weight, fractional composition and filler type. In Figure 1, a typical rheological curve is represented for a polymer fraction with a molecular weight of 81,000 at a temperature of 82°C. In Table 1 the dependence of the viscosity of the rubber on the molecular weight is shown. The viscosity of fraction III with a molecular weight of 202,000 is $1.38 \cdot 10^{11}$ poise; the viscosity of fraction VII with an approximate molecular weight of 27,000 is only $6.34 \cdot 10^{4}$ poise. The influence of the fractional composition was investigated on 4 samples with a characteristic viscosity of 1.24. Sample 1 is an integral polymer; sample 2 consists of the fractions III, IV, and VI; sample 3 is the homogeneous fraction IV. Table 2 shows that the ability of plastic flow does not depend on the molecular weight, but is determined by the characteristic viscosity. Polymers with equal characteristic viscosity and different

Card 1/2

The Plastoelastic Properties of SKN-26 Rubber

polydispersity, differ in the value of deformation at constant stress. The dependence of the viscosity of wet filled mixtures on temperature was also investigated. The fillers were introduced at quantities of 10.9 - 100 volume parts of the rubber. Table 3 shows that the filler reduces not only the speed of irreversible deformation by increasing the viscosity of the mixture, but also increases the value of elastic deformation. The dependence of filled mixtures on the temperature is shown in Table 4. The viscosity is decreased 17 times when the temperature is increased from 24°C to 82°C. This is an indication that in a system where the formation of black-rubber complexes is possible, the flow at low shear stresses takes place according to the mechanism of shifting of segments.

There are 6 graphs, 4 tables, and 12 references, 10 of which are Soviet, 1 American, and 1 English.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti, Moskva (Scientific Research Institute of the Rubber Industry, Moscow)

SUBMITTED: December 26, 1957

Card 2/2

1. Rubber—Properties 2. Rubber—Viscosity 3. Rubber—Temperature effects

DOROKHINA, T.V.; NOVIKOV, A.S.; ZUBOV, P.I.

Effect of the shape of molecular chains on the properties of solutions and vulcanized films made of butyl rubber. Vysokom. soed. 1 no.1:36-45 Ja '59. (MIRA 12:9)

1. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti i Nauchno-issledovatel'skiy fiziko-khimicheskiy institut im. L.Ya. Karpova.
(Rubber, Synthetic)

15(9) SOV/63-4-1-9/31

AUTHORS: Novikov, A S , Galil Ogly F A Candidates of Chemical Sciences

TITLE: Heat-, Oil- and Frost Resistant Rubbers (Teplo-maslo morozo-stoykiye reziny)

PERIODICAL: Khimicheskaya nauka i promyshlennost 1959, Vol 4 Nr 1, pp 63-69 (USSR)

ABSTRACT: Modern machine building and jet aviation needs rubber products for raised temperatures of 120 - 150°C and 400 - 500°C, for low temperatures of -40 to -60°C and for various aggressive media, like oils, fuels, peroxides, etc. It is not possible to develop a polymer which satisfies all these demands In every single case the suitable rubber must be chosen The heat- and oil-resistance is determined by the chemical structure of the rubber The addition of various ingredients has only a slight effect. The bonds with the highest thermal resistance are of the type C-S-C and C-C Free sulfur in the vulcanizate has a negative effect on heat-resistance The polysulfide bond decomposes to bi-radicals during heat aging and has the same effect like sulfur Unsaturated rubbers should be vulcanized without sulfur by means of [illegible] by heat, active irradia-

Card 1/3

tion [Ref 2] The presence of active carbon blacks reduces the absorption of oxygen and the oxidation of the polymer at a temperature of 100°C. At 150 - 200° this inhibiting effect of the carbon black disappears and the vulcanization processes are accelerated At these temperatures highly dispersed mineral fillers, like silicic acid metal silicates etc must be employed The heat resistance of unsaturated rubbers may be increased by adding aliphatic mercaptans to the double bonds of the rubber Rubbers with high heat resistance of 200 - 300°C may be obtained only by using rubber like polymers, e.g. copolymers of acrylic acid with the nitrile of the acrylic acid, silicon rubber etc Saturated polymers are vulcanized by heating in the presence of organic peroxides Their decomposition products can destroy the C-C bond High-energy radiations [Ref 44 45] have shown good results in the vulcanization of these rubbers During irradiation C-C bonds are formed The resistance of rubbers to oils and solvents is determined by polarity It does not depend on the method of vulcanization The change of the polarity during vulcanization is considerable Rubber obtains an increased resistance to oils fuels etc The resistance to solvents may be improved by choosing a filler which is inert to the medium,

Card 2/3

but combines with the rubber. Polytetrafluoroethylene is such a filler for polysiloxane rubber. Unsaturated rubbers in an oil medium do not age so fast as in hot air because there is no oxygen. The frost-resistance is determined by the composition and the structure of the rubber. Plastication is the best method for increasing this property. For this purpose esters of the phthalic, adipinic and sebacic acids are used. The fluorosilicon rubber of the type LS53 reaches a frost-resistance of -60°C, a heat-resistance of 200 - 250°C and a high oil-resistance but its mechanical properties are so low that it can be used only for packings diaphragms etc There are 3 tables and 57 references, 24 of which are Soviet, 32 English and 1 German

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001137420013-9"

21(4) SOV/89-6-5-6/33

AUTHORS: Galil-Ogly, F. A., Nikitina, T. S., Dyumayeva, T. N., Novikov, A. S., Kuz'minskiy, A. S.

TITLE: On the Radiation Vulcanization of Fluorine Copolymers (O radiatsionnoy vulkanizatsii ftorsopolimerov)

PERIODICAL: Atomnaya energiya, 1959, Vol 6, Nr 5, pp 540-545 (USSR)

ABSTRACT: If rubber-like fluorine copolymers are irradiated, rubber having unsatisfactory physical and mechanical properties is obtained. If various additions are added to these substances before irradiation, rubber having valuable technical properties may be obtained. The rubber-like fluorine copolymer "Kel'-F" is experimentally used as elastomer. Irradiation was carried out with Co^{60}-disks (thickness 0.3 to 1.0 mm) with an activity of 1400 and 21000 gramequivalent Ra. The integral absorbed energy corresponded to 3 to 80.10^6 r. The structural change in the irradiated material was determined from the changed solubility, from the swelling limit in acetone, from the modulus E_∞, and from other physico-mechanical parameters. As additions the following substances are used: Channel black, white soot, furnace carbon black, thermal carbon

Card 1/3

On the Radiation Vulcanization of Fluorine Copolymers

black, and zinc oxide. The experimental results are tabulated and partly shown in form of graphs. The following is worth mentioning in connection with the curves: Dependence of tearing strength, the relative elongation, the modulus E_{∞}, and the swelling limit on the radiation dose; the influence exercised by air and vacuum on swelling and the modulus E_{∞} in the case of various radiation doses; the influence exercised by the addition of carbon black on spatial net formation as a result of irradiation. Dependence of the strength of the rubber on the quantity of carbon black added (irradiation dose 20.10^6r). The following general conclusions may be drawn from the experiments: The surface activity of the additional substances exercises a decisive influence on the properties of the rubbers. The rubber which contains channel black as an addition possesses the best technical properties after irradiation. It is, above all, more resistant to heat-aging, solubility, and static deformation. The fluorine copolymers of the "Kel'-F"-type tend more towards cross-linking than polytetrafluoroethylene and polytrifluoroethylene chloride. Cross-linking is promoted by the addition of oxygen. There are 9 figures, 1 table, and 10 references, 2 of which are Soviet.

S/138/59/000/07/04/009

AUTHORS: Devirts, E. Ya., Novikov, A. S.

TITLE: On the Mechanical and Thermooxidizing Plastication of Butadiene-Nitrile Rubbers

PERIODICAL: Kauchuk i Rezina, 1959, No. 7, pp. 21-25

TEXT: The structural transformations which take place in the mechanical and thermooxidizing plastication of butadiene-nitrile rubbers were studied. The authors state that although several publications have appeared in print on the study of plastication of butadiene-styrene and natural rubbers, very little has been published on the plastication of butadiene-nitrile rubber, only on the mechanical plastication, as given in Ref. 5, by one of the authors of this article. The authors stress the importance of the SKN rubber for industry and undertake further investigations of the mechanical and thermooxidizing plastication of these rubbers. The results of experiments for studying the structural transformations are submitted. The experimental part is outlined in detail, and the computations are submitted. It was found that in mechanical plastication of the butadiene-nitrile rubbers, the process of destruction takes place primarily, which is seen from the monotonous nature of the change in the hardness and elasticity (according to Defoe), and in the characteristic tenacity.

Card 1/3

S/138/59/000/07/04/009

On the Mechanical and Thermooxidizing Plastication of Butadiene-Nitrile Rubbers

results that the rate of the mechanical and thermooxidizing plastication of the butadiene-nitrile rubbers is determined mainly by the content of nitrile groups in them. However, opposite regularities are noted. With an increase in the nitrile of acrylic acid content, the rate of the mechanical plastication increases, whereas in the thermooxidizing plastication the rate of destruction decreases, and the role of the structuralizing process increases. The structuralizing processes are most pronounced in the SKN-40 rubber and least in the SKN-18. The SKN-26 rubber occupies an intermediate position, coming close to the SKN-18 rubber. There are 7 graphs, 7 references. 4 Soviet, 3 English.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti (Scientific Research Institute of the Rubber Industry)

Card 3/3

15 9210

S/138/59/000/07/06/009
B2265

AUTHORS: Galil-Ogly, F. A., Skuba, I. A., Novikov, A. S.

TITLE: Metal Fluorides - Fillers for Fluorocopolymer Rubbers

PERIODICAL: Kauchuk i Rezina, 1959, No. 7, pp. 31-36

TEXT: The authors discuss the problem of increasing the thermal resistance of rubbers used in machine-building. They point out that this property can be improved by the addition of special thermoresistant fillers to the fluorine-containing rubbers. Attention is drawn to Ref. 4, 5, where information is available on thermoresistant fillers used abroad in the last 3 years, such as sodium, cesium, lithium, calcium zirconates, fluorozirconates, etc. In the present article various metal fluorides were investigated as fillers for fluorocopolymer rubbers. The latter were evaluated according to the thermo-resistant properties of the resultant rubbers, as compared to rubbers filled with powdered silica gel, U-333, used at the present time for the production of rubber peroxides from fluorocopolymers. Lithium, zinc, barium, magnesium, strontium, calcium, and aluminum fluorides were investigated. A description is given of differences in their surface structure. Figure 1 is an electronic microphotograph of the metal fluorides, pointing out the structural differences

Card 1/3

S/138/59/000/07/06/009

Metal Fluorides - Fillers for Fluorocopolymer Rubbers 82265

Table 2 is a list of the physico-mechanical properties of the rubbers with various fluorine-containing fillers. The investigated metal fluorides occupy the following sequence as to their effect on the thermoresistance of the rubber: Magnesium, calcium, strontium, aluminum, lithium and zinc fluorides. It was found that barium fluoride promotes the process of destruction in the rubber during aging, which is accompanied by a sharp increase in the relative elongation of the rubber. All the metal fluorides were found to have a greater effect on the thermoresistant properties of the rubbers than powdered silica gel. The calcium fluoride yields the most elastic rubber with an increased relative elongation. Calcium fluoride was further investigated as to its initial structure, method of its production and the initial raw material used. It was shown that rubbers, containing calcium fluoride of various initial raw materials are characterized by different strength and thermoresistance. The optimum type of calcium fluoride, as a filler for fluorocopolymers, is the product obtained from the reaction between sodium fluoride, or ammonium fluoride and calcium chloride, or calcium oxide. This product gives a rubber of increased strength and thermoresistant properties. The drying temperature of the calcium fluoride affects the physico-chemical characteristics and properties of the obtained calcium fluoride. Its activity also depends on the type of applied vulcanizing group. In 1958, a

Card 2/3

S/138/59/000/07/06/009

Metal Fluorides - Fillers for Fluorocopolymer Rubbers 82265

technology for the production of calcium fluoride was developed and its serial production was begun. The following conclusions are drawn: 1) The investigated metal fluorides ensure a higher thermal resistance of the rubber than the U-333, but have less strengthening effect than the latter. 2) The most active metal fluorides are the calcium and magnesium fluorides, their effectiveness depending on their specific surface and particle structure. 3) The activity of the calcium fluoride depends also on the nature of the initial raw material used in its production. 4) Particles of active calcium fluoride are characterized by a corroded surface, 0.01-0.1 micron in size, and a specific surface of 32-27 m^2/g. 5) The activity of the calcium fluoride also depends on the content of the mixture and vulcanization method. There are 5 tables, 3 figures, 6 English references.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti (Scientific Research Institute of the Rubber-Manufacturing Industry)

Card 3/3

S/138/59/000/011/004/011
A051/A029

15-9210 also 2109, 2209

AUTHORS: Devirts, E. Ya., Novikov, A. S.

TITLE: The Effect of Oxidation-Reduction Systems on the Thermo-Oxidizing Mastication of Butadiene-Nitrile Rubbers

PERIODICAL: Kauchuk i Rezina, 1959, No. 11, pp. 17-20

TEXT: An experimental study was conducted on accelerating the thermo-mastication process of CKH(SKN) rubbers by introducing into the latex an oxidation-reduction system consisting of dimethylphenylparacresol and the salts of iron. This results in the formation of SKN thermomasticated rubbers (Ref. 1). The structural transformations of SKN rubbers in thermo-oxidizing mastication in the presence of the oxidation-reduction system was also investigated and the results are submitted in this article. The effect of the molecular structure on the properties of the vulcanizates pointed out. The following rubber trade marks were studied: SKN-18, SKN-40. The experimental conditions are outlined and the optimum dimethylphenylparacresol used for each type of rubber are 1-6 indicate the changes in the hardness and elasticity,

S/138/59/000/011/004/011
A051/A029

The Effect of Oxidation-Reduction Systems on the Thermo-Oxidizing Mastication of Butadiene-Nitrile Rubbers

according to Defoe, of the experimental and serial rubbers tested, depending on the duration and the temperature of the thermal mastication process. Several conclusions are drawn from the experimental results: 1) the processes of destruction and structuralizing take place simultaneously in thermal mastication of the tested SKN-18 and SKN-26 rubbers containing dimethylphenylparacresol, and also in the case of similar mass-produced rubbers, but the rates of these processes in both cases differ greatly. There is a considerable increase in the destruction process, and a decrease of the structuralizing process to a great extent in the case of the experimental rubbers. The reverse is seen in the mass-produced rubbers. It is stated that by using the oxidation-reduction system consisting of dimethylphenylparacresol and the salts of iron, the considerable increase in the destruction rate and the decrease of the structuralizing process makes it possible to use this method in industry for SKN rubbers. 2) In the case of the SKN-40 rubber a thermal masticated rubber having a hardness of less than 1,000 g according to Defoe is impossible to obtain with the oxidation-reduction system. SKN-18 has the highest rate of destruction, whereas

Card 2/4

S/138/59/000/011/004/011
A051/A029

The Effect of Oxidation-Reduction Systems on the Thermo-Oxidizing Mastication of Butadiene-Nitrile Rubbers

SKN-40 rubber has the lowest, since with an increase in the number of nitrile groups in the polymer the rate of the destruction process decreases and the rate of the structuralizing process increases. 3) It was found that with an increase in the temperature of the thermal mastication the destruction process rate increases, but at the same time the role of the structuralizing process becomes more apparent. The optimum temperature of the thermal mastication process was found to be 130°C for the SKN-18 and SKN-26 rubbers. In the case of the SKN-40 rubber the optimum temperature was 140°C. 4) From a comparative study of the rubbers masticated by thermo-oxidation and masticated mechanically, having the same hardness according to Defoe, it was found that the vulcanizate mixtures based on the thermo-masticated rubbers of the experimental butadiene-nitrile rubbers are somewhat surpassed in their durability and elasticity by similar vulcanizates from the mechanically masticated rubbers. However, the indices obtained for the vulcanizates of the thermo-masticated rubbers are sufficiently high for use in industry. There are 3 tables, 9 graphs and 4 Soviet references.

Card 3/4

S/138/59/000/011/004/011
A051/A029

The Effect of Oxidation-Reduction Systems on the Thermo-Oxidizing Mastication of Butadiene-Nitrile Rubbers

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti (Scientific Research Institute of the Rubber Industry)

Card 4/4

S/138/59/000/012/002/006

AUTHORS: Shvetsov, V. A., Pisarenko, A. P., Novikov, A. S.

TITLE: An Investigation Into the Properties of Filled Nitrile Rubbers. Communication 1. The Properties of Filled Silicate-Nitrile Rubbers 15

PERIODICAL: Kauchuk i Rezina, 1959, No. 12, pp. 4-8

TEXT: At present two types of powdered silica gel are manufactured in the Soviet Union, viz. soft and hard silica gel, imparting different properties to the rubber. It is further stated that powdered silica gel is irreplaceable as an accelerator in the production of colored rubber based on synthetic rubbers with high mechanical indices and has many advantages over the carbon blacks. One of the most popular types of silica gel is aerosil, which is just as active as any carbon black. It is pointed out that the Soviet rubber industry lacks sufficient quantities of the silica gel accelerators and the available types have some serious disadvantages due to the backward production methods used. Their quality is not homogeneous. The necessity of producing filled rubbers based on synthetic raw material by some other means is pointed out. A short survey is given

Card 1/4

S/138/59/000/012/002/006

An Investigation Into the Properties of Filled Nitrile Rubbers.
Communication 1. The Properties of Filled Silicate-Nitrile Rubbers

of the methods recently used for this purpose. The All-Union Scientific Research Institute of Film Materials and Artificial Leather (VNIIPIK) developed in 1951-1953 a method for the production of filled butadiene-styrene rubbers, using silicates of various metals obtained in the latex as fillers. The CKH-18 (SKN-18), CKH-26 (SKN-26) and CKH-40 (SKN-40) type butadiene-nitrile rubbers are used in the rubber industry for the production of oil-resistant rubber. The authors were particularly interested in determining the possibilities of producing oil-resistant and heat-resistant butadiene-nitrile rubbers, filled with silicate fillers during the latex stage. These rubbers were named silicate-nitrile rubbers. It was shown that the strength of the rubber increases considerably when the filler is introduced in the latex stage, and much less so, when introduced on the rollers. This is true even for small quantities of the filler, such as 20 weight parts of filler to 100 weight parts of the rubber. For greater amounts of filler, e.g. 60 weight parts of filler to 100 weight parts of rubber the relative elongation is 575-674%. The high structuralizing properties of the silicate fillers obtained in the latex can be seen from the hardness determination according to Defoe. The mechanical processing of the

S/138/59/000/012/002/006

An Investigation Into the Properties of Filled Nitrile Rubbers.
Communication 1. The Properties of Filled Silicate-Nitrile Rubbers

silicate-nitrile rubbers presents little difficulty in spite of the high values of hardness according to Defoe due to the weakening of the secondary rubber-filler bonds and due to an increase in the fluidity of the mixture caused by an increase in the mixing temperature. The rupture-, wear-resistance and the elasticity of the rubbers filled in the latex is higher than those filled on the rollers. The former also have a better roadability. The thermal-resistance is the same. Tables 2 and 3 give the comparative figures of the various properties. At elevated temperatures the rubbers filled in the latex retain their strength better than those filled on the rollers, they have better resistance to thermal aging. The aging was carried out at 100, 110, 120 and 130°C lasting from 12 hours to 10 days. The high resistance to aging of the vulcanizates is explained by the active filler blocking the double bonds of the hydrocarbon rubber, which decreases the reactivity of the rubbers, inhibiting the development of the oxidizing processes (Ref. 5). Long-lasting storage does not change the properties of the silicate-nitrile vulcanizates, which is of practical significance in the mass production of this rubber in the form of chunks. SKN-26 rubber with 60 weight parts of calcium silicate and filled in the latex stage will

Card 3/4

An Investigation Into the Properties of Filled Nitrile Rubbers. Communication 1. The Properties of Filled Silicate-Nitrile Rubbers

dissolve to only 16.5% in a 75% chlorobenzene and 25% n-dichlorobenzene system, whereas without the filler it would dissolve completely. The vulcanizate with a silicate-nitrile base has a high resistance to swelling, corresponding to the swelling observed in the SKN-26-based rubbers. Rubbers produced from silicate-nitrile raw material have better properties than those produced from nitrile rubbers, where the filler is introduced on the rollers, and are very valuable for the production of various oil-resistant commercial articles.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti (Scientific-Research Institute of the Rubber Industry)

NOVIKOV, A.S.; KARGIN, V.A.; GALIL-OGLY, F.A.

Fluidity of rubbers at high temperatures. Kauch. i rez. 18 no.1:39-42 Ja '59. (MIRA 12:1)

1.Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti.
(Rubber, Synthetic--Testing)

15.3120 2209, 2109, 1526
11.2214

84502
S/190/60/002/004/002/020
B004/B056

AUTHORS: Novikov, A. S., Karpov, V. L., Galil-Ogly, F. A., Slovokhotova, N. A., Dyumayeva, T. N.

TITLE: Investigation of the Effect of Ionizing Radiations Upon the Chemical Structure of Rubber-like Fluorine Copolymers

PERIODICAL: Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 4, pp. 485-491

TEXT: The authors proceed from published data (Refs. 1-5), according to which, unlike what is the case with polytetrafluoroethylene and polytrifluorochloroethylene, in the case of rubber-like copolymers, not destruction but structure formation is caused by ionizing radiation (radiation vulcanization). The authors therefore investigated this process on СКФ-32 (SKF-32) fluorine polymers. As a radiation source, a Co^{60} apparatus with an activity of 1,400 and 21,000 gram-equivalent of radium was used. The intensity of irradiation was $0.54 \cdot 10^6$ r/h; the total dose was $3 - 80 \cdot 10^6$ r. The copolymer films were irradiated in air

Card 1/4

84502
S/190/60/002/004/002/020
B004/B056

Investigation of the Effect of Ionizing Radiations Upon the Chemical Structure of Rubber-like Fluorine Copolymers

or vacuum (10^{-4} torr). The chemical changes occurring as a result of irradiation were examined by infrared spectroscopy. By means of an ИКС-14 (IKS-14) spectrometer, the spectra in the range from 500 to 1450 cm^{-1} were taken on 4μ thick films, and within the range from 1450 - 3500 cm^{-1} on 140 - 150μ thick films. Fig. 1 shows the infrared spectrum of the initial copolymer, which is interpreted by the authors. Irradiation in air leads to considerable changes (Figs. 2,3). The intensity of the absorption bands of oxygen-containing groups and of the $-CF=CF_2$ group increases considerably, while the intensity of the C-H, C-F, C-Cl bond stretching vibrations decreases. Herefrom it is concluded that gaseous compounds containing H, F, or Cl are liberated. Fluorine copolymer irradiated in vacuum shows a different spectrum (Fig. 4). At small doses (10.10^6 - $20 \cdot 10^6$ r), the absorption bands 1640 cm^{-1} (-CH=CF-); 1740 cm^{-1} (-$CH=CF_2$ or R-CF=CF-R); and 1840 cm^{-1} occur. The latter band is interpreted by the authors as belonging to the group $-CF=CF_2$. At higher doses, instead of the 1740 and 1840 cm^{-1} bands, a broad band with a maximum at 1800 cm^{-1} occurs. This is explained by the

Card 2/4

Investigation of the Effect of Ionizing Radiations Upon the Chemical Structure of Rubber-like Fluorine Copolymers

formation of cross links at the expense of the double bonds. The considerably decreasing solubility with increasing radiation dose (Fig. 5) confirms this assumption. An increased content of vinylidene-fluoride promotes cross linking (Fig. 6). A linear interrelation between cross links and vinylidenefluoride content was found (Fig. 7). At the same time, however, also destruction occurs, which manifests itself by decreasing viscosity (Fig. 8). The authors draw the conclusion that in the fluorine copolymer the same reactions occur during irradiation as in polyethylene: loosening of C-H bonds accompanied by the formation of free radicals and free hydrogen atoms, which either form compounds with neighboring H, F, or Cl atoms under the formation of double bonds and H_2, HF, or HCl, or take such atoms away from another polymer chain under the formation of a further free radical. The recombination of the free radicals leads to cross linking. With increasing copolymer content, the number of double bonds increases. There are 8 figures and 8 references: 5 Soviet, 1 US, 1 French, and 1 British.

Card 3/4

84502
S/190/60/002/004/002/020
B004/B056

Investigation of the Effect of Ionizing Radiations Upon the Chemical Structure of Rubber-like Fluorine Copolymers

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physicochemical Institute imeni L. Ya. Karpov)

SUBMITTED: November 26, 1959

Card 4/4

85411

S/ 90/ / / / /
B001/B0

11.2211

AUTHORS: [illegible], V. A. N[illegible], A. S. [illegible], A. [illegible]

TITLE: Study of the Structure of V[illegible] of [illegible] Butadiene nitrile Rubbers by Stretching

PERIODICAL: Vysokomolekulyarnyye soyedineniya, [illegible] pp. 1608 - 161[illegible]

TEXT: The authors wanted to find out whether the [illegible] equation for elongation as a function of stress, as developed by A. F. [illegible]nard and D. Parkinson (Ref.4) was also applicable to [illegible] rubbers filled with channel black or aluminum hydroxide. The [illegible] Parkinson equation is written down: lnF [illegible] Here, F denotes the stress per unit area of the [illegible] a is the number of elongations [illegible] a modulus which [illegible] bonds including the sulfur bonds of the [illegible] characterizing the interaction between rubber and [illegible]. The authors first conducted tests with CKH 26 (SKN-26) rubber [illegible] black, calcium silicate, or aluminum hydroxide. The [illegible] was

Card 1/[illegible]

85411

Study of the Structure of Vulcan Zone Reinforced Butadiene-nitrile Rubbers by Stress Relaxation

S/[illegible]/[illegible]/[illegible]/[illegible]
B004/B064

[illegible] at 20°C at a rate of 200 mm/min [illegible] rapid stretching with 30-120 kg/cm² [illegible] increase of [illegible] Table 1:

Card 2/5

85411

Study [illegible] the Structure of Vulcanizates [illegible] S/[illegible]
Reinforced Butadiene nitrile Rubbers by B[illegible]/[illegible]
Stretching

Value of G at a preliminary stretching of kg/cm²: (1)	Composition [illegible] in parts [illegible] volume				
	Natural rubber with 28 channel black (2)	SKN 2[illegible] with [illegible] black (3)	SKN [illegible] (4)	SKN [illegible] (5)	SKN 2[illegible] (6)
without prior stretching	9.2	[illegible]	[illegible]	[illegible]	[illegible]
G 30	9.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
G 80	[illegible]	[illegible]	4.[illegible]	[illegible]	[illegible]
G 120	6.2	[illegible]	[illegible].8	[illegible]	[illegible]
Bonds left over after maximum stretching	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Moreover, values are given for the coeff[illegible] G[illegible] [illegible] bonds[illegible] the coefficient of primary bonds. G[illegible] the [illegible]

Card 3/5

Study of the Structure of Vulcanizates of [illegible] Reinforced Butadiene Nitrile Rubbers by Straining

Calculations were made on the basis of equation [illegible] $\gamma = \alpha S/G^{2/3}$ is written for [illegible] section.

Table 2

Composition of rubbers in parts by volume	G	[illegible]	[illegible]
Natural rubber with 28 ch. black	[illegible]	[illegible]	[illegible]
SKN-26 with 28 ch. black	8.8	[illegible]	[illegible]
SKN-26 with 17 ch. black	6.3	[illegible]	[illegible]
SKN-26 with 28 $Al(OH)_3$	8.6	[illegible]	[illegible]
SKN-26 with 17 $Al(OH)_3$	6.3	[illegible]	[illegible]

Basing on these data, the following conclus[illegible] Blanchard equation is also appl[illegible]

Card 4/5

85411

Study of the Structure of Vulcanizates of Reinforced Butadiene-nitrile Rubbers by Stretching

S/190/60/002/0[illegible]/003/02[illegible]
B004/B060

filled with channel black or aluminum hydroxide. 2) Vulcanizates from butadiene nitrile rubber filled with aluminum hydroxide are stretched up to a higher degree than the same rubbers filled with channel black 3) Natural rubber has more primary bonds while SKN 26 filled with channel black but especially with aluminum hydroxide has more secondary bonds The structure of the vulcanizates therefore differs G. A. Petrikeyev is mentioned There are 2 figures 2 tables and [illegible] references: 2 Soviet 2 US 2 British and German

ASSOCIATION: Nauchno issledovatel skiy institut rezinovoy promyshlennosti (Scientific Research Institute of the Rubber Industry)

SUBMITTED: February 2 1960

Card 1/5

86318

S/190/60/002/012/001/019
B017/B055

21.6100
15.9206 2209

AUTHORS: Novikov, A. S., Karpov, V. L., Galil-Ogly, F. A., Slovokhotova, N. A., Dyumayeva, T. N.

TITLE: The Effect of Metal Oxides on Structural Changes in Fluorinated Rubber Copolymers Caused by Ionizing Radiation and High Temperatures

PERIODICAL: Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 12, pp. 1761-1767

TEXT: The authors studied the effect of metal oxides (CaO, MgO) on the chemical changes in fluorinated rubber copolymers under the influence of ionizing radiation, applying a Co^{60} source with activity 21.000 gram-equivalents and intensity $0.54.10^6$ r/h. The chemical changes in the fluorinated polymers were investigated by infrared spectroscopy in the 4.000 - 1.300 cm^{-1} region on the ИКС-14 (IKS-14) spectrometer. The mechanical properties of irradiated fluorinated polymers with and without a metal oxide content are given in a table. The admixture of small

Card 1/3

86318

The Effect of Metal Oxides on Structural Changes in Fluorinated Rubber Copolymers Caused by Ionizing Radiation and High Temperatures

S/190/60/002/012/001/019
B017/B055

quantities of calcium oxide was found to increase polymer strength. The change in strength after irradiation of polymers containing varying amounts of calcium oxide is shown graphically in Fig. 1. The viscosity of methyl-ethyl ketone solutions of the polymers decreases after irradiation. The infrared spectra of fluorinated polymers type СКФ-32 (SKF-32) before and after irradiation, with and without calcium oxide, are shown in Figs. 5,6, and 7. A considerable number of conjugate double bonds of the type -CH=CCl-, and OH and HF_2^- groups were found to form in the presence of metal oxides. Metal oxides prevent the formation of volatile compounds during irradiation, since they react with these compounds. Calcium and magnesium oxide bind volatile compounds which form on heating fluorinated polymers to 200°C under pressure. The infrared spectra of fluorinated polymers before and after heating under pressure to 200°C, with and without admixture of calcium oxide are given in Fig. 8. In the irradiation of fluorinated polymers, the metal oxides act as acceptors for hydrogen-fluoride and hydrogen-chloride compounds and for fluorine, chlorine, and hydrogen. There are 8 figures, 1 table, and 11 references:

Card 2/3

86318

The Effect of Metal Oxides on Structural Changes in Fluorinated Rubber Copolymers Caused by Ionizing Radiation and High Temperatures

S/190/60/002/012/001/019
B017/B055

5 Soviet, 3 US, and 3 British.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti (Scientific Research Institute of the Rubber Industry).
Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physicochemical Institute imeni L. Ya. Karpov)

SUBMITTED: May 11, 1960

Card 3/3

83837

S/138/60/000/004/003/008
A051/A029

15.9200 also 2209

11.2220

AUTHORS: Shvetsov, V.A., Novikov, A.S., Pisarenko, A.P.

TITLE: The Properties of Filled Aluminate-Nitrile Rubbers

PERIODICAL: Kauchuk i Rezina, 1960, No. 4, pp. 12 - 17

TEXT: The results of the development of a method for producing ni
trile rubbers filled with aluminum hydroxide in the latex (called aluminate-
-nitrile rubber) are given. With this method it is possible to produce vul-
canizates with high physico-mechanical properties. No complex apparatus is
necessary and the aluminate-nitrile rubbers have a higher mechanical resis
tance than the silicate-nitrile rubbers. The CKH-18 (SKN-18) and the CKH-26
(SKN-26) latexes were used in the production of the aluminate-nitrile rubber.
Vulcanizates produced from aluminate-nitrile rubber have a high elasticity.
The specific elongation in SKN-26 reaches 1,000 - 1,100%. Rubbers with alu-
minum hydroxide obtained from the latex, as well as that with introduction
on the rollers have an elevated residual elongation and a high resistance
to wear and tear. The resistance to repeated bending and crack growth is
higher in vulcanizates with aluminum hydroxide introduced into the latex

Card 1/4

The Properties of Filled Aluminate-Nitrile Rubbers

compared to introduction on the rollers only. In order to study the resist ance of the rubber to thermal effect, samples of various vulcanizates were subjected to aging in a thermostat at temperatures [illegible], beginning with 12 hours and lasting up to 10 days. The best results showed rubbers with aluminum hydroxide introduced on the rollers. Aluminate nitrile rubbers can be stored for a long time without changing their properties The authors attempted to discover why the filler obtained in the latex has a higher strengthening power as compared to the filler produced separately and intro- ducei into the rubber on the rollers. They also tried to determine the com- parative properties of mineral fillers of the potassium silicate and alumin- um hydroxide types, e.g., gaseous channel carbon black. The structuralizing role played by the fillers was investigated experimentally and found to cor- respond favorably with previous data (Refs. 2 - 5). The experiments also showed that the high strengthening ability of calcium silicate and aluminum hydroxide obtained in the latex can be explained by the high dispersion of the particles of the filler and good distribution of the filler in the rubber mass, as well as the absence of aggregation of the particles, formation of chain structures by the filler and the ability of the filler to form a bond

The Properties of Filled Aluminate-Nitrile Rubbers

of the adsorption type with the rubber. The experimental data also proved that the presence of the SO_4 group in the molecule does not affect the strengthening ability of aluminum hydroxide produced in the latex, contrary to other opinions. The SO_4 group can have an effect on the crystallization process which takes place when the filler is produced outside of the latex and, therefore, on the structure and dispersion of the filler and, thus indirectly on the strengthening ability of the latter. The method developed for producing aluminate-nitrile rubbers has great significance for the Soviet Rubber Industry, since it lowers the energy consumption, the time needed to produce the mixtures and improves the productivity of the mixing apparatus. The rubber produced in the form of chunks enables one to automate the weighing and loading processes during mixing. It also enlarges the assortment of the different rubbers used in the manufacturing of oil-resistant and thermo-resistant rubber products. Finally, this method replaces the use of scarce carbon black, since the aluminate-nitrile rubber yields vulcanizates similar in their properties to that of the vulcanizates on a gaseous carbon black base. There are 6 tables, 1 figure and 10 Soviet references.

Card 3/4

83837

S/138/60/000/004/003/008
A051/A029

The Properties of Filled Aluminate-Nitrile Rubbers

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti i Vsesoyuznyy nauchno-issledovatel'skiy institut plenochnykh materialov i iskusstvennoy kozhi (Scientific Research Institute of the Rubber Industry and All-Union Scientific Research Institute of Film Materials and Synthetic Leather)

Card 4/4

NOVIKOV, A.S.; GALIL-OGLY, F.A.; SLOVOKHOTOVA, N.A.; DYAMAYEVA, T.N.; KARGIN, V.A.

Vulcanization of fluorine-containing copolymers with polyamines with the use of infrared spectroscopy. Vysokom. soed. 4 no.12:1799-1805 D '62. (MIRA 15:12)

1. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti.
(Fluorine compounds)
(Polymers) (Vulcanization)

34293

S/138/60/000/005/005/[illegible]
A051/A029

15.5205 2209 2103

AUTHORS: Nudel'man, Z.N., Novikov, A.S.

TITLE: The Structuralizing Reaction of Polydimethylsiloxanes in the Cold Vulcanization of Polysiloxane Rubbers

PERIODICAL: Kauchuk i Rezina, 1960, No. 5, pp. 17 - 20.

TEXT: The present article is dedicated to the experimental confirmation of the condensation of alkoxy-derivative metals, metal-organic groups and silicon of the general formula $M(OR)_n$, (where M is a metal, silicon, etc., R an alkyl or aryl group, n the valency of M), at the hydroxyl groups of the polysiloxanes and also to the study of the mechanism of this condensation. It is proven that the condensation of the polyalkoxysilanes with polydimethylsiloxanes takes place only at the hydroxyl groups of the latter. The complex-catalytic nature of the solidification of the polysiloxanes at room temperature is also shown. In order to clarify the mechanism of condensation at the free hydroxyl groups, the effect of certain admixtures on this reaction was investigated. For example, by adding aluminum pyridine

- the structur[illegible]
with two types of pol[illegible]
- the relation[illegible]

Card 1/4

S/138/60/000/005/005/011
A051/A029

The Structuralizing Reaction of Polydimethylsiloxanes in the Cold Vulcanization of Polysiloxane Rubbers

and the molecular weight of the polysiloxane. The experimental procedure is outlined and the structural formulae of the reacting compounds are presented. The results of the indicated experiments point in favour of the reaction scheme of the polysiloxanes and the alkoxy-derivatives of metals at the hydroxyl groups. It is stated that the reaction of polysiloxane with butylorthotitanium is a hydrolysis of the latter by the moisture of air to orthotitanic acid and subsequent condensation of this acid with hydroxyl groups. Another possible mechanism is the formation of an intermediate complex compound, metal alcoholate with the polysiloxane, as a result of the donor-accepting bond of the metal atom with the oxygen atom of the hydroxyl group with subsequent detachment of the alcohol. As a result of the experimental facts, the authors claim that it is easy to explain the difference in the nature of the gels obtained from polydimethylsiloxane, aluminum butylate and butylorthotitanium. The accepted assumptions on the mechanism of the condensation reaction made it possible to use tetraethoxysilane as the structuralizing agent in this reaction or other polyalkoxy-

05042

S/064/60/000/006/05[illegible]/[illegible]
B020/B054

159130 1526, 1153, 1474

AUTHORS: Tsyskovskiy, V K, Levina, M I, Novikov, A S, and Dorokhina, T V

TITLE: A New Plasticizer for Low-temperature Resistant Rubbers

PERIODICAL: Khimicheskaya promyshlennost', 1960 No 6 pp 21-2[illegible]

TEXT: The presence of polar groups in the structure of butadiene-styrene (CKH(SKN)) and polychloroprene rubbers reduces the flexibility of the polymer chains, and makes these polymers useless at -40°C Dibutyl phthalate (DBP) and dibutyl sebacate (DBS) are most used for SKN rubber and nairite; these plasticizers are, however, expensive, and their initial substances are difficult to procure The authors suggested a highly efficient, cheaper plasticizer which can be prepared from monocarboxylic fatty acids instead of from dicarboxylic acids The monocarboxylic acids $C_1 - C_{20}$ were produced by continuous oxidation of liquid paraffins The acids were allowed to react with diethylene glycol at 200-220°C for 4-5 hours until no more reaction water was released The yield in ester

Card 1/3

85642

A New Plasticizer for Low-temperature Resistant Rubbers

S/064/60/000/006/[illegible]/[illegible]
B020/B054

was 99.5% with reference to the acids. Some ester samples were obtained in this way which were designated as "Ester No 2" and cost less than half the price of DBP. Vulcanizates with varying plasticizer content were produced from this Ester No 2 as plasticizer as well as rubber mixtures on the basis of SKN-26 and nairite by vulcanization at 143°C for 30-60 min. The results show that Ester No 2 increases the low temperature resistance of vulcanizates of SKN-26 to almost double the value as compared with DBP and makes them nearly equivalent to rubber sorts with DBS plasticizer. Similar results were obtained for nairite. The volatility of Ester No 2 at 100°C is low. The effect of the plasticizer on the plasticity of nairite mixtures is graphically shown in Fig. 3. A. G. Blok, V. V. Karsayevskaya, and A. I. Gertsovskaya, collaborators of the "Kauchuk" Plant, compared the properties of rubbers made with Ester No 2 according to works formulas for the production of technical rubber products with those of the corresponding products with the use of the same amount of DBP or DBS. The experimental data showed that the plasticity of the raw mixtures and the physicomechanical properties of the finished products did not differ from each other. There are 3 figures, 5 tables, and 5 references: 4 Soviet and 1 German.

Card 2/3

85642

A New Plasticizer for Low-temper[illegible] Resistant Rubbers

S/064/60/000/006, 003/[illegible]
B020/B054

ASSOCIATION: VNIIneftekhim (All-Union Scientific Research Institute Petroleum Chemistry) V K Tsyskovskiy, M I Levina,
NIIRP (Scientific Research Institute of the Rubber Industry A S Novikov, T V Dorokhina

Card 3/3

TSYSKOVSKIY, V.K.; LEVINA, M.I.; NOVIKOV, A.S.; DOROKHINA, T.V.

New plasticizer for frost-resistant rubbers. Khim. prom. no. 6:459-461 S '60. (MIRA 13:11)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut neftyanoy khimii (for TSyskovskiy, Levina). 2. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti (for Novikov, Dorokhina).
(Plasticizers) (Rubber)

36564

S/081/62/000/006/110/117
B168/B101

15.9130

AUTHORS: Devirts, E. Ya., Kaplun, M. G., Nudel'man, Z. N., Novikov, A. S.

TITLE: Chemical mastication of natural and butadiene-styrene rubbers

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 6, 1962, 692, abstract 6P560 (Tr. N.-i. in-ta rezin. prom-sti, sb. 7, 1960, 3 - 16)

TEXT: Methods of producing the chemical plasticizers peptone 22 (I) and rhenacite V (II) have been worked out and these substances have been synthesized under laboratory conditions. I, II and imported rhenacite IV (III) were tested as accelerators for the mastication of natural rubber and SKS-30A (SKS-30A). I, II and III are effective chemical plasticizers for mastication of natural rubber in the rubber mixer at 120 - 130°C. II and III accelerate mastication of natural rubber on rollers at 70 - 80°C. I, II and III do not affect the physico-mechanical properties, the resistance to heat ageing or the swelling of rubbers. II is an effective plasticizer for SKS-30A when the rubber is being processed in the rubber mixer and on rollers. [Abstracter's note: Complete translation.]

Card 1/1

16553

S/081/62/000/006/108/117
B168/B101

15.9701

AUTHORS: Devirts, E. Ya., Novikov, A. S.

TITLE: The properties of soft butadienenitrile rubbers of type СКН-40 (SKN-40) which do not require mastication

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 6, 1962, 690 - 691, abstract 6P549 (Tr. N.-i. in-ta rezin. prom-sti, sb. 7, 1960, 17 - 24)

TEXT: The properties of a soft rubber of type SKN-40 (I) with a Defoe hardness of 900-1300 g are compared with series rubber of type SKN-40 (II) with a Defoe hardness of 1500 - 3000 g. Unvulcanized mixes of I have much greater plasticity than those of II (0.43 as against 0.24 on Karrer's scale). Vulcanized rubbers I are equal to those of type II in their physico-mechanical properties, in their frost-resistance coefficient at -15°C, in their brittle point, in their heat ageing coefficient and heat resistance at 100°C and in their swelling in a benzine-benzene mixture (3:1); they show a somewhat higher specific and residual elongation and also lower moduli (200%). Vulcanized rubbers I are more resistant when

Card 1/2

The properties of soft...

stored under warehouse conditions for 9 months than are those of type II. When I is used mechanical mastication, with its heavy demands on labor and power, is no longer necessary. In order to ensure that mixtures of SKN-40 can be prepared in the rubber mixer, it is necessary to produce I with a Defoe hardness of 700 - 1000 g. [Abstractor's note: Complete translation.]

X

Card 2/2

40295
S/081/62/000/014/029/039
B166/B144

15.9300

AUTHORS: Novikov, A. S., Kaluzhenina, K. F., Gilinskaya, N. S., Kazakov, A. V.

TITLE: The manufacture of heat-resistant rubbers based on butadiene nitrile-rubber

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 14, 1962, 646, abstract 14P332 (Tr. N.-i in-ta rezin. prom-sti, sb. 7, 1960, 25-33)

TEXT: The influence of stabilizers on the thermal oxidation ageing of CKH (SKN) at 150°C was determined from the magnitude of the induction period of oxidation and from the character of structural changes in the oxidized rubber (due to the change in swelling and solubility of the rubber when oxidized). The stabilizers tested can be arranged in the following order according to the magnitude of the induction period: dinaphthyl-p- phenylene diamine > Resamine C > diphenylol propane > mercapto benzimidazole (I) and "fatty red C" > dimethylphenyl-p-cresol (II) and Neozone D (III) > nitroso-β-naphthol. Films containing II, I and III had the highest solubility. The smallest degree of structuration is observed in the presence of I and II. For heat-resistant rubbers it is preferable

Card 1/2

S/138/60/000/009/005/012
A051/A029

11.2211

AUTHORS: Devirts, E.Ya.; Novikov, A.S.

TITLE: On the Application of Dark Indene-Coumarone Resins in Rubber Mixtures

PERIODICAL: Kauchuk i Rezina, 1960, No. 9, pp 27 - 33

TEXT: A study was conducted for determining the possibilities of applying Soviet-manufactured indene-coumarone resins in rubber mixtures. Until the present time these resins were used only in the enamel and dye industry, in building materials etc. The quality of the Soviet resins are indexed in the МПТУ (MPTU) 2261-49 standards. The authors list the various raw materials used in their production, indicating the difference which these cause in the color and softening point of the resin. The indene-coumarone resins were tested for 1) softeners in standard mixtures based on butadiene-styrene rubber СКС-30 (SKS-30), СКС-30АРМ-15 (SKS-30ARM-15) (butadiene-styrene regulated oil-filled rubber), nairite and butadiene-nitrile СКН-26 (SKN-26) rubber. 2) diluters (extenders) for the partial replacement of the SKS-30ARM-15 and SKN-26 rubbers and nairite. Six samples of the dark-colored resin were tested at softening points of 62 - 83°C. In testing the resin as a softener, and trying three methods for the resin introduction in

Card 1/4

85657

S/138/60/000/009/005/013
A051/A029

On the Application of Dark Indene-Coumarone Resins in Rubber Mixtures

pieces, sifted and melted, it was found that the highest tear-resistance was achieved when the resin was introduced in the filtered form and the lowest when the resin was introduced in pieces. The softening characteristics of the resin were compared to standard softeners, such as rubrax and AB (AB) resin and it was seen that the indene-coumarone resin (dark color) is almost equivalent to the other softeners. The dark indene-coumarone resin with a softening temperature of 60 - 80°C is an effective softener for general rubber mixtures based on buta-diene-styrene rubbers. It imparted favorable industrial properties to the non-vulcanized mixtures and high adhesiveness, strength and tensility indices to the vulcanizates. In applying the indene-coumarone resin the amount of sulfur and altax must be increased, whereby the optimum results are achieved at an increase in the sulfur content to 0.2 weight parts and to 0.2 weight parts of altax per every 5 weight parts of resin. Indene-coumarone resin in nairite based rubber mixtures compared with mixtures containing vaseline oil and polydienes has almost the same softening effect as vaseline oil if applied in doses of 5 - 10 weight parts and even more so with 15 weight parts. It surpasses vaseline oil in increasing the adhesiveness. The vulcanizates of mixes containing the indene-coumarone resin are equal to those containing vaseline oil in their hardness index

Card 2/4

S/138/60/000/009/005/012
A051/A029

On the Application of Dark Indene-Coumarone Resins in Rubber Mixtures

300% elongation modulus, thermal aging resistance at 100°C but have higher relative and residual elongations and a tendency to an elevated tear resistance. They are inferior to vaseline-oil mixtures in their elasticity, brittleness point and frost-resistance. In testing the resin in SKN-26-based mixes and comparing them with the action of dibutylphthalate it was found that, when increasing the sulfur content to 0.1 weight parts to every 5 weight parts of the resin, the latter has about the same effect on the softening properties as dibutylphthalate. However, at larger doses of the resin than 5 - 10 weight parts its softening effect decreases. Vulcanizate mixtures containing 10 - 25 weight parts of the resin have the same modulus at a 200% elongation, the same temperature stability and heat-aging resistance as mixtures containing the same amount of dibutylphthalate. The tear-resistance, hardness index, tenacity, relative and residual elongation are higher and the elasticity and frost-resistance lower. The resin can be used as a diluter (extender) in mixtures of general use based on butadiene-styrene rubbers, nairite and butadiene-nitrile rubbers in the dosage of 5 weight parts, which ensures a saving on the amount of rubber consument. In replacing 5 - 10 weight parts of SKS-30 ARM-15 rubber mixture with the resin the plasticity increases somewhat. In replacing 10 weight parts of the mix with the resin all the proper-

S/138/60/000/009/005/012
A051/A029

On the Application of Dark Indene-Coumarone Resins in Rubber Mixtures

ties of the mixture are retained, except for a small drop in tenacity. The nairite-based mixtures change their properties in accordance with the amount of the nairite replaced by the resin. SKN-26-based mixtures when replaced by the resin show a slight increase in plasticity. Five weight parts replaced by the resin hardly changes the properties at all, and 10 - 15 weight parts causes a drop in tenacity, in the modulus at 200% elongation, elasticity, the frost-resistance coefficient, brittleness point, an increase in the relative and residual elongation, aging and temperature-resitance coefficients, maintaining the same hardness index, tear-resistance and swelling. There are 7 tables and 7 figures.

ASSOCIATION: Nauchno-issledovatel'skiy institut resinovoy promyshlennosti (Scientific-Research Institute of the Rubber Industry)

S/138/60/000/012/002/009
A051/A027

15 9205 2209

AUTHORS: Novikov, A.S., Nudel'man, Z.N.

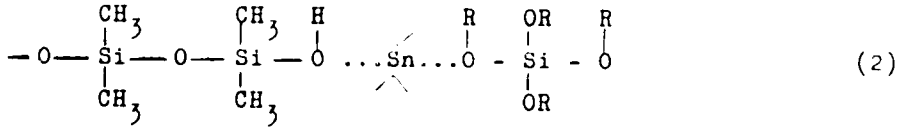
TITLE: The Kinetics and Mechanism of the Catalytic Reaction Between Polydimethylsiloxanes and Polyalkoxysilanes

PERIODICAL: Kauchuk i rezina, 1960, No.12, pp. 3-7

TEXT: In a previous work (Ref.1) the authors dealt with the catalytic reaction of structuralizing of polydimethylsiloxane rubber with alkoxysilanes, which takes place by condensation of the latter with the hydroxyl groups of polydimethylsiloxane and separation of alcohol. In this acticle it is pointed out that the mechanism of the reaction has been only slightly investigated and it is further suggested that the kinetics of the reaction be studied during the period from its start until the moment of the spatial lattice formation. Such an investigation was carried out by measuring the elasticity growth of the benzene solution of the CKT (SKT) rubber after it had been mixed with the catalyst and the structuralizing agent in a spherical Hepler viscosimeter. It was shown that the elasticity growth was determined only by the growth of the molecule. Fig.1 shows that the growth process of the

The Kinetics and Mechanism of the Catalytic Reaction Between Polydimethylsiloxanes and Polyalkoxysilanes

elasticity for the system 15% solution of SKT in benzene-tetraethoxysilane-catalyst (0.5 g) is not uniform. The shape of this curve is explained by the many-stage type of reaction of structuralizing (Ref. 5). It is suggested that the initial part of the curve is determined by the first stage of the reaction which consists in the formation of the intermediary complex compound of one molecule of the catalyst with one molecule of the hydroxyl group of the polydimethylsiloxane and one molecule of oxygen of the tetraethoxysilane molecule:

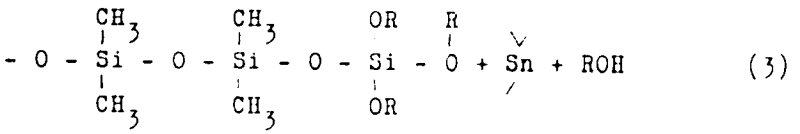


(2)

This complex is then regrouped and a new siloxane bond is formed, a catalyst molecule is separated off, probably in the form of a complex with the separated alcohol molecule:

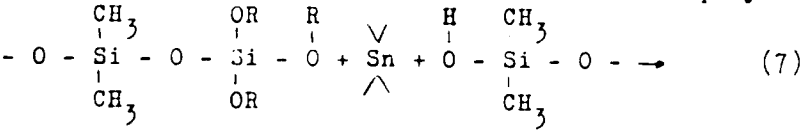
S/138/60/000/012/002/009
A051/A027

The Kinetics and Mechanism of the Catalytic Reaction Between Polydimethylsiloxanes and Polyalkoxysilanes



(3)

The latter stage of the reaction corresponds to the part of the curve parallel to the abscissa axis. It is not the induction period, since the reaction is taking place although not causing an increase in the molecular weight of the system. Other confirmations of the interaction with initial formation of a transfer complex were obtained from infrared spectra of the system (Figs. 2,3). These graphs prove that there is no induction period necessary in the formation of the complex in the given system. The second stage of the reaction increases the molecular weight to twice the amount of polysiloxane:



(7)

20251
S/138/60/000/012/002/009
A051/A027

The Kinetics and Mechanism of the Catalytic Reaction Between Polydimethylsiloxanes and Polyalkoxysilanes

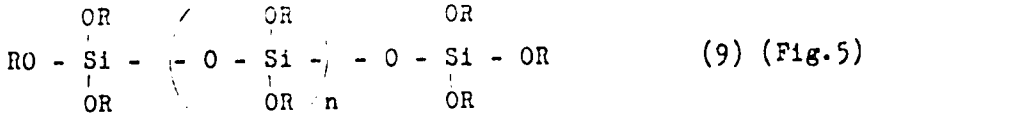
$$\rightarrow -O-\underset{\underset{CH_3}{|}}{\overset{CH_3}{|}}{Si}-O-\underset{\underset{OR}{|}}{\overset{OR}{|}}{Si}-O-\underset{\underset{CH_3}{|}}{\overset{CH_3}{|}}{Si}-O- \qquad (7 \text{ contin.})$$

The further acceleration of the viscosity increase is determined by the starting branching of the molecule and also by the decrease of the low-molecular products in the solution and by the increase in the probability of the active collisions of large molecules leading to an immediate increase in the molecular weight. It is concluded that the multi-stage nature of the structuralizing reaction in the case of the saturated polarization of the oxygen-silicon bond is connected with the thermodynamic impossibility of the formation of a multi-charge silicon ion according to scheme (3). This conclusion led to the assumption that the reaction kinetics must change if a polyalkoxy derivative of silicon is used as the structuralizing agent, in one molecule of which the formation of several positive ions is assumed

Card 4/8

The Kinetics and Mechanism of the Catalytic Reaction Between Polydimethylsiloxanes and Polyalkoxysilanes

possible, i.e., molecules where the donor-acceptor bond with one atom of silicon would not significantly change the density of the electrons in the other oxygen atoms. The reaction mechanism of catalytic condensation of polydimethylsiloxane with tetraethoxysilane and other polyalkoxysiloxanes is confirmed on an example of the gelatination of a benzene solution of SKT in the presence of a polyethoxysiloxane-type structuralizing agent, where n = 5 - 10:



(9) (Fig.5)

There are 5 graphs and 5 Soviet references.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti (Scientific Research Institute of the Rubber Industry)

S/138/60/000/012/002/009
A051/A027

The Kinetics and Mechanism of the Catalytic Reaction Between Polydimethylsiloxanes and Polyalkoxysilanes

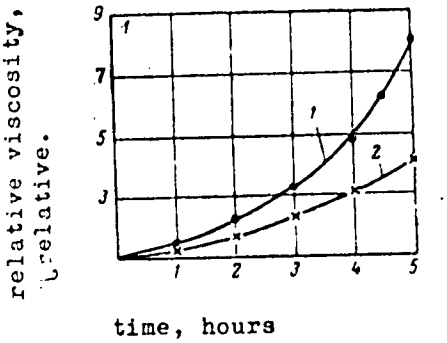


Fig. 1 Viscosity increase in a 15 % solution of SKT in benzene with tetraethoxysilane and catalysts: 1 - dicaprinate of dibutyl tin, 2 - distearate of dibutyl tin.

Card 6/8

20251
S/138/60/000/012/002/009
A051/A027

The Kinetics and Mechanism of the Catalytic Reaction Between Polydimethylsiloxanes and Polyalkoxysilanes

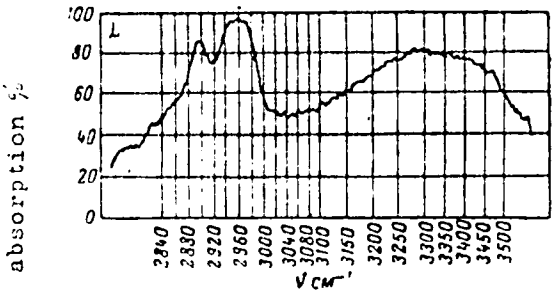


Fig.2 Infrared spectrum of polydimethylsiloxane with molecular weight of about 4,000.

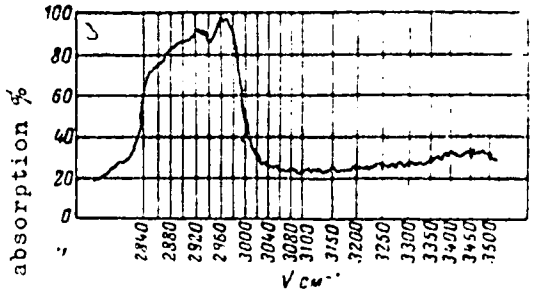


Fig.3 Infrared spectrum of a polydimethylsiloxane mixture with an 8% tetraethoxysilane and 2% dicaprinate of dibutyl tin immediately after preparation.

Card 7/8

20251
S/138/60/000/012/002/009
A051/A027

The Kinetics and Mechanism of the Catalytic Reaction Between Polydimethylsiloxanes and Polyalkoxysilanes

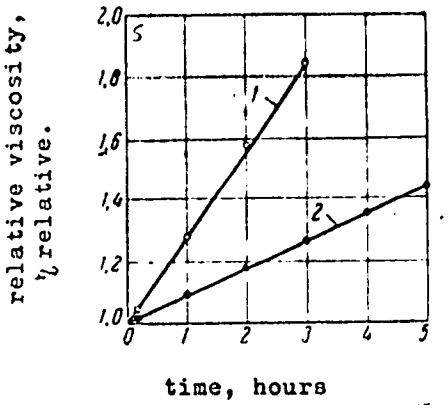


Fig. 5 Viscosity increase in a 15% solution in benzene with polyethoxysiloxane and catalysts: 1- dicaprinate of dibutyl tin, 2- distearate of dibutyl tin.

Card 8/8

68702
S/069/60/022/01/008/025
D034/D003

5(4)

15.9220

AUTHORS: Novikov, A.S., Tolstukhina, F.S.

TITLE: The Effect of Fillers on the Properties of Polydimethylsiloxane

PERIODICAL: Kolloidnyy zhurnal, 1960, Vol XXII, Nr 1, pp 42-48(USSR)

ABSTRACT: This is a study of the effect of silica fillers on the structure and mechanical properties of polydimethylsiloxane rubber mixtures and vulcanizates. The authors used the following fillers: aerosil, ultrasil, microsil, powdered silica gel, and also titanium dioxide. The weak molecular interaction, which is characteristic for polydimethylsiloxane, makes it a suitable object for investigation, because it permits observation of very inconsiderable changes in its mechanical properties. The interaction of polymer and filler was characterized by elementary analysis of the quantity of bound rubber

Card 1/3

68702
S/069/60/022/01/008/025
D034/D003

The Effect of Fillers on the Properties of Polydimethylsiloxane

in the gel and by the number of effective chains of the gel network. The effect of the arising structures on the mechanical properties of the polymer-filler mixture was investigated by measurement of the development and fall of creep. The structure of the vulcanizates was determined from their swelling characteristics and by the apparent equilibrium modulus of elasticity. On preparing the mixture by mastication the silica fillers form stable chemical polymer-filler bonds. The activity of the investigated fillers decreases in the order: aerosil, ultrasil, powdered silica gel, microsil. It was further found that the chemical polymer-filler bonds are not only preserved, but increase during the vulcanization process. The rheological curves for filled mixtures deviate the more from the straight lines which are characteristic for Newtonian liquids,

Card 2/3

68702

S/069/60/022/01/008/025
D034/D003

The Effect of Fillers on the Properties of Polydimethylsiloxane

the more rubber will be linked to the fillers. The number of the forming polymer-filler bonds increases linearly in dependence on the volume of the introduced filler. The mechanical properties of the vulcanizates are higher, the greater the capacity of the filler for structuration. The authors mention a dynamometer of the type Polyan' ("dinamometer tipa Polyani"), which was used for the measuring of stresses in vulcanizates. There are 6 sets of graphs, 4 tables and 9 references, of which are English and 3 Soviet.

ASSOCIATION: Institut rezinovoy promyshlennosti, Moskva (Institute of the Rubber Industry, Moscow)

SUBMITTED: December 23, 1958

Card 3/3

69467
S/069/60/022/02/015/024
D034/D002

54

15.9200

AUTHORS: Shvetsov, V.A., Pisarenko, A.P., Shtarkh, B.V., Novikov, A.S.

TITLE: An Electron Microscopic Study of the Structures of Reinforced Rubbers

PERIODICAL: Kolloidnyy zhurnal, 1960, Vol XXII, Nr 2, pp 233-236 (USSR)

ABSTRACT: The authors report on the results of an electron microscopic study of the structuration of silicate and aluminate fillers in rubbers of the type SKN-18 and SKN-26. The silicate fillers were obtained from sodium silicate and calcium chloride silicate, the aluminate fillers - from the carbonates of sodium and aluminum sulfate. The study, which was carried out with an electron microscope of the type EM-3 (magnification - 7500), showed in the rubber solutions

An Electron Microscopic Study of the Structures of Reinforced Rubbers

the presence of sol and gel rubber fractions and of loose coagulation structures of the fillers (see electron microscopic photographs on insert). The dispersity of the elementary particles of aluminate fillers is more pronounced than the dispersity of silicate fillers; the visibility of the particles is near the limit of the resolving capacity of the electron microscope. On the whole it could be shown that high dispersity, low aggregation tendencies and the ability to form loose network and chain coagulation structures on the part of the fillers are highly important factors in the reinforcement of rubbers. The authors mention B. Dogadkin and collaborators [Ref. 2], who showed that the main reinforcing action of hydrocarbon blacks consists in the formation of chain and network structures in the

69467
S/069/60/022/02/015/024
D034/D002

An Electron Microscopic Study of the Structures of Reinforced Rubbers

rubber mixtures. A.P. Pisarenko and collaborators [Ref 5] (in agreement with P.A. Rebinder and his school) showed that the participation of surface-active substances (additives) in the formation of mineral fillers determines basic characteristics of the fillers, as high dispersity and the ability to form chain and network structures. The authors' investigation was carried out on the lines of the results obtained by these scientists. There are 5 electron microscopic photographs on a centerfold and 9 Soviet references.

ASSOCIATION: Nauchno-issledovatel'skiy institut plenochnykh materialov i iskusstvennoy kozhi, Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti;

Card 3/4

69467

S/069/60/022/02/015/024
D034/D002

An Electron Microscopic Study of the Structures of Reinforced Rubbers

Moskva (Scientific Research Institute of Film Materials and Synthetic Leather, Scientific Research Institute of the Rubber Industry; Moscow)

SUBMITTED: February 7, 1959

Card 4/4

87768

11.2210
15.9200

2109, 1209, 1419

S/069/60/022/006/003/004
B013/B066

AUTHORS: Shvetsov, V. A., Pigarenko, A. P., and Novikov, A. S.

TITLE: Problem of Investigating the Bond Character in the System Rubber - Filler

PERIODICAL: Kolloidnyy zhurnal, 1960, Vol. 22, No. 6, pp. 743-747

TEXT: The authors applied the method devised by B. Dogadkin and co-workers (Refs. 1 and 2) to study the dispersion of calcium silicate an aluminum hydroxide in rubber mixtures and in vulcanized rubber. The present paper reports the results with respect to aluminum hydroxide. The partial or complete extraction of aluminum hydroxide from the rubber by boiling in weak NaOH solutions was shown to be possible. The shortest extraction time (2 hours) was found to correspond to the optimum filling of 60 parts by weight. In this case a maximum development of structure occurs with a markedly pronounced continuous phase of the filler, which facilitates the penetration of the solvent into the rubber. With poor filling, the chain structure of the filler is less pronounced, and extraction is more time-consuming. This rule also holds for plasticized

Card 1/3

87768

Problem of Investigating the Bond Character in the System Rubber - Filler

S/069/60/022/006/00?/008
B013/B066

rubbers (binary system rubber - filler) The extraction in this case, however, proceeds more slowly than in rubbers that had not been rolled, which is due to a denser structure and a higher number of rubber - filler bonds. On incorporation of aluminum hydroxide during the rolling less compact rubbers were obtained than on incorporation of the filler into latex. The filler incorporated during rolling was found not to form chain structures. The authors further studied the effect of stearin as a dispersion medium on the properties of the resultant rubber The extraction of aluminum hydroxide was found to be accelerated by the introduction of stearin. In vulcanized rubbers the aluminum hydroxide extraction takes place in the same way as in non-vulcanized systems. The comparatively easy extraction of aluminum hydroxide from rubber mixtures and vulcanized rubber indicates that prevalently physical bonds, presumably of the adsorption type, are formed between the individual filler and the nitrile rubber. Stable chemical bonds are either not formed at all or only to a low extent. After incorporation of aluminum hydroxide into the latex state and after subsequent extraction of this filler the rubbers disclose properties which differ from the original ones. The mixtures obtained on the basis of extracted CKH-26 (SKN-26) rubber gave much harder vulcanized

Card 2/3

87758

Problem of Investigating the Bond Character in the System Rubber - Filler

S/069/60/0..,/006,00 ,00.
B013/B066

rubbers than mixtures of SKN-26 rubber obtained from latex. The tensile strength is in the former case 42 kg/cm² (relative elongation ...%), in the latter case 31 kg/cm² (relative elongation 510%). The rubbers were dried at 120°C. The higher strength of the vulcanized rubbers obtained from rubber whose filler had been extracted suggests a possible structure formation under the action of aluminum hydroxide, that is, the formation of direct bonds between the polymer molecules during the heat treatment of the system rubber - filler. There are 9 figures and 9 references: 5 Soviet, 2 German, 1 US, and 1 British.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti, Moskva (Scientific Research Institute of the Rubber Industry, Moscow)

SUBMITTED: August 27, 1959

Card 3/3